Journal of Business Studies, Vol. 44, No. 1
DOI: https://doi.org/10.3329/dujbst.v44i1.84733

Comprehensive Analysis on Determinants of Bank Profitability in Bangladesh

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Abstract: *The study investigates the relationship between bank profitability and a comprehensive list of bank-specific, industry-specific and macroeconomic variables using unique panel data from 23 Bangladeshi banks with large market shares from 2005 to 2023 employing the Pooled Ordinary Least Square (POLS) Method for regression estimation. The random Effect model has been used to check for robustness. Three variables, namely, Return on Asset (ROA), Return on Equity (ROE), and Net Interest Margin (NIM), have been used as profitability proxies. Non-interest income, capital ratio, market share, and GDP growth have been found to have a significant relationship with ROA. For NIM, non-interest income, operating expenses, market share, bank size, inflation and real exchange rates are found to be significant. Profitability measured as ROE is significantly explained by non-interest income, liquidity, market share, and inflation. The primary contribution of this study to the existing knowledge base is an extensive empirical analysis by covering the entire gamut of independent variables (bank-specific, industry-related, and macroeconomic) to explain the profitability of the banks in Bangladesh. It also covers an extensive and recent data set. Banking sector stakeholders may find great value from the outputs of this paper: Regulators and policymakers may find this useful in undertaking analyses in setting policy rates, banking industry stability, and impact assessment of critical policy measures before and after the enactment, etc. Investors and the bank management are to use the findings of this paper in analyzing the real drivers of profitability of the banks they're contemplating to invest and managing on a day-to-day basis.*

Keywords: Bank profitability, Bangladesh banking sector

Received: 17/10/2024, Reviewed: 13/01/2025, Accepted: 11/02/2025, Published: 30, June 2025

1. Introduction

From a global perspective, banks' profitability and drivers have been a topic of curiosity among academicians and practitioners. Numerous studies around the world, especially in the developed economies, have been carried out to pinpoint the factors capable of explaining

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the profitability of banks and the exact nature of the relationship between these two sets of variables.

Bangladesh, like many other emerging markets around the world, has had a primarily bank-dominated financial system since its birth in 1971 which is evident by Bangladesh's banking sector's size relative to the economy. Qamruzzaman and Jianguo (2017) note that 65% of the financial sector assets are held collectively by all the commercial banks. Their research also suggest that banking sector's development plays a "growth-supporting" role in Bangladesh. However, banking sector has gone through tremendous changes in the past two decades including a high number of fourth generation banks (established post-2010) coming into the market, introduction and popularization of mobile financial services (MFS) (the first MFS guidelines were published in 2011 by the Central Bank), digitalization of banking services, emergence of alternative investment opportunities through FinTech models, high-inflationary environment etc. It would be reasonable to assume that these changes gave rise to a significant increase in intra-industry competition and overall challenges to the sector. Such heightened competition and challenging environment are generally expected to put noteworthy pressure on the banks' profit margins. Despite this new world where the Bangladeshi banks are having to operate and perform, academic research on this critical pillar of the economy is rather limited.

In this backdrop, we conduct this study to identify both the endogenous (bank-specific) and exogenous (industry- and economy-specific) factors that are significant determinants of bank profitability in an emerging economy like Bangladesh. The output from such research is expected to be valuable for all the related stakeholders, from the bank management to shareholders/investors to regulators/policymakers, as it is critically important for them to understand which factors drive profitability of Bangladeshi banks.

Based on the reviewed literature, we report a few studies investigating determinants of bank profitability in Bangladesh that have focused on certain aspects of bank performance. From early researchers like Sufian and Habibullah (2009) to Mondol and Wadud (2022), the studies primarily focused on bank-specific variables. Studies on Bangladeshi banking sector do not take an all-rounded approach, i.e., these studies do not consider variables from bank-specific sources, industry sources, and macroeconomic sources, all at the same time in the same model. Most of these studies are limited to internal or bank-specific sources only and at best extends the scope of the profitability drivers to macroeconomic sources. On the other hand, most of them suffer from data obsolescence problem.

Our study addresses this deficit in two ways. First, our empirical models consider the bank-specific, industry-related, and macroeconomic factors, thus enabling us to understand the profitability issue with a three-sixty-degree view in an increasingly challenging business environment. Second, we cover a sample of banks over a large (2005-2023) and more recent period, thus providing more appropriate and recent empirical evidence for a comprehensive empirical model such as ours. This combination of extensive data and a comprehensive selection of bank-related, industry-specific and macroeconomic factors enable us to contribute to the existing literature.

The output from this paper is a valuable tool for related stakeholders. Regulators and policymakers may find this useful in undertaking analyses in setting policy rates, banking industry stability, and impact assessment of critical policy measures before and after the enactment etc. Investors and the bank management are to use the findings of this paper in analyzing the real sources/drivers of profitability of the banks they're contemplating to invest and managing on a day-to-day basis.

This paper is organized as follows: Section II covers a review of the relevant literature, section III presents the methodology, including the econometric model, data, and empirical model description, section IV discusses the results, and section V concludes the paper and suggests scope for further research.

2. Literature review

We can classify the previous literature on bank profitability determinants from several angles: some researchers have studied only bank-specific or internal variables. Some others have studied external (industry-related and macroeconomic) variables and their effect on bank profitability. Many studies cover single-country data, whereas studies done in a multi-country or multi-continent setting are also common. Lastly, researchers focused on undertaking studies based on the life-cycle stage of economies – developed, developing, emerging, etc. We present a review of the previous literature based on geographic classification:

Table 1 below summarizes the common types found in earlier literature:

Table 1: Common Study Types on Bank Profitability and Its Determinants

Development-stage of the economy	Type of variable used	Geography-based
Developed/High-income	Bank-specific/internal variables	Single country
Developing/Middle-income	Industry-specific/external variables	Multi-country
Emerging/Lower-middle-income	Macroeconomic/environmental variables	Multi-continent

Source: Author construct

Single-country studies: Finding the significant variables

For bank-specific factors which have a strong influence on the profitability of banks, studies were conducted by researchers from across the world. For example, Hasan et al. (2020), used return on asset (ROA) and return on equity (ROE) as bank profitability measures in the context of Indonesia. He demonstrated that for the ROE, variables like net interest margin, capital adequacy ratio, loan to deposit Ratio etc., were significant. Ali and Puah (2018) conducted a panel regression analysis of 24 Pakistani commercial banks for the 2007-2015 periods and found a statistically substantial impact of bank size, credit and funding risk on profitability. Al-Jarrah et al. (2010) conducted a study using the cointegration and error correction models to identify the determinants of profitability on all Jordanian banks over 2000- 2006. According to the study, loans and advances outstanding to total assets ratio, noninterest or operating expenditures ratio, the capital arrangement, and the deposit to asset ratio are important internal determinants of profitability. Growe et al. (2014) undertook a study during 1994-2011 over U.S. regional banks using the Generalized Method of Moments (GMM) estimator technique. They found that the level of nonperforming assets is negatively related to all measures of profitability. Bhatia et al. (2012) tried to examine the private sector banks' profitability determinants in India from 2006-07 to 2009-10. Backward Stepwise Regression Analysis has been conducted on 23 banks to identify the relationship of these determinants and banks' performance. The study reveals that loan and advances outstanding to deposit ratio, Capital adequacy ratio, and non-interest income directly impact Return on Assets. In another study on the Indian banking sector from 2000 to 2008, Sufian and Noor (2012) liquidity and operating expenses significantly impacted profitability.

Kawshala and Panditharathna (2017) implementing the panel data method on 12 Sri Lankan domestic commercial banks, revealed that variables such as capital ratio, deposit ratio, etc., have a significant and positive relationship with bank profitability and liquidity negatively associated with profitability. Belke and Unal (2017) went beyond the typical bank-specific factors and conducted their study on 23 deposit banks in Turkey using the panel regression method. According to the study, bank size, capital, inflation rate, economic growth, market concentration, exchange and policy rate, etc., have a significant impact on bank profitability. However, the impact and influence differ in terms of listed and non-listed banks.

Kosmidou et al. (2005) studied U.K.-owned commercial banks during 1995-2002 to identify bank-specific characteristics, macroeconomic conditions, and financial market structure on banks' profits and found that capital strength and efficiency in expenses management positively and leading influence on their performance.

Single-country studies: Summarizing variable-wise directional relationships

Asset structure has been found to be a critical determinant of bank profitability. According to Lee and Hsieh (2013); Menicucci and Paolucci (2016), a high volume of deposits leads to higher profits. Similar results were found by Saeed (2014) in his study. He investigated the impact variables of profitability on 73 U.K. commercial banks from 2006 to 2012 and concluded that capital ratio, loan outstanding, the volume of deposits, amount of liquidity, and interest rate positively impact ROA and ROE. However, Demirguç-Kunt and Huizinga (1998) found a mixed relationship between deposit and profitability.

An increase in operating expenses causes the profitability of Turkish banks to fall, commented Alp et al. (2010). They also identified that there does not exist any statistically significant relationship between total loans and receivables to total assets ratio with the indicators of profitability. Sufian and Chong (2008) examine the performance determinants of banks in the Philippines during the period 1990–2005. The study suggests that operating expense is negatively related to ROA and ROE while the capital and non-interest income positively impact profitability. On the other hand, Bolarinwa et al. (2018) conducted a study on Nigeria using the system generalized method of moments, which showed that cost-efficiency works as a strong determinant in attaining profitability in developing countries.

Sufian (2011) used 251 bank information of Korea from 1992-2003 and found that liquidity had negative and noninterest income has a positive relationship with profitability. Goddard, Molyneux, and Wilson (2004) concluded that banks with higher liquidity witnessed lower profits. Shoaib et al. (2015) had a similar conclusion with regards to the relationship between profitability and liquidity for banks in Pakistan. Kosmidou (2006); Pasiouras et al. (2006) revealed an adverse effect of liquidity on bank profitability as well.

Apart from liquidity, capital adequacy has been found to have a positive strength on bank profitability in many studies. Macit (2012) conducted a study using quarterly unconsolidated balance sheets of participating banks that operated between 2005 and 2010 in Turkey. The study found that the equity to total asset ratio had a positive impact on profitability. Gul et al. (2011) used the pooled Ordinary Least Square (POLS) method to identify the relationship between bank-specific and macroeconomic characteristics over bank profitability by using data of top 15 Pakistani commercial banks over 2005-2009. They identified that assets, loans, equity, and deposits positively impact all three profitability indicators, i.e., ROA, ROE, and NIM. The impact of capital adequacy was observed by Shoaib et al. (2015) in a study on banks in Pakistan too. Acaravci and Çalim (2013) found that capital adequacy had a significant and positive impact on profitability. Similarly,

according to Hassan and Bashir (2003), bank profitability measures responded positively to the increases in capital.

Non-performing loans are supposed to have a negative relationship with bank profitability, as confirmed by Shoaib et al. (2015). They conducted a study through the POLS regression model by using the panel data of all scheduled banks of Pakistan from 2006-2013. The empirical results show that banks' profitability is adversely affected by nonperforming loans, liquidity, and administrative expenses. Growe et al. (2014) undertook a study during 1994-2011 over U.S. regional banks using the Generalized Method of Moments (GMM) estimator technique. They found that the level of nonperforming assets is negatively related to all measures of profitability. Acaravci and Çalim (2013) explained that in the case of private commercial banks, the volume of deposits had an insignificant impact on profitability and higher nonperforming loans reduced profitability by a large extent. Macit (2012) also reported that the ratio of nonperforming loans to total outstanding loans and advances had a negative relationship with profitability.

Industry and macroeconomic variables in single-country studies

Batten and Xuan (2019) led a study on Vietnam using the panel data method that suggested a substantial impact on profitability from variables like bank size, risk, expense, productivity, capital adequacy, etc. In contrast, industry-related features and macroeconomic variables negatively affect the profitability measures of a bank. Besides, the causality direction is not consistent across profitability measuring proxies.

Rani and Zergaw (2017) conducted their study on Ethiopian banks using multiple regression models to analyze the bank-specific and industry and macroeconomic specific determinants of profitability. The study showed a negative impact of internal and industry-related variables on profitability. In contrast, macroeconomic determinants showed a positive but somewhat insignificant relationship with the net profit margin of the Ethiopian banks.

Hasanov et al. (2018) undertook their study in Azerbaijan, which carries an oil-dependent economy implementing the Generalized Method of Moments that indicated internal and external variables like bank size, asset, and liability, oil price, inflation rate, economic cycle, etc. have a positive relationship with profitability. On the other hand, deflation of the exchange date, amount of deposit, and risk regarding the liquidity can negatively affect profitability measures.

Evidences from multi-country studies

Mauricio et al. (2014) found a positive relationship between capital adequacy and profitability by using the panel data of 78 commercial banks from Argentina, Brazil, Chile, Colombia, Mexico, Paraguay, Peru, and Venezuela over the period from 1995 to 2010.

Empirical evidence by Demirguc-Kunt and Huizinga (1999) suggests that banks that preserve higher equity levels compare to their assets tend to perform better. Goaied (2008); Pasiouras and Kosmidou (2006); Dietrich and Wanzenried (2009); Obamuyi (2013); Garcia-Herrero et al. (2009); Menicucci, and Paolucci (2016) found that higher equity ratio on total assets can be an essential factor on the profitability of banks in Europe.

Sahyouni and Wang (2018) conducted their study using the panel data fixed effect technique on 11 developed and emerging countries for the 2011-2015 period. They concluded that management, capital ratio, and bank size indicate a positive relationship with profitability, whereas banks that generate higher liquidity are likely to achieve lower profitability.

Islam and Nishiyama (2016) empirically studied the bank-specific, industry specific and macroeconomics specific determinants of bank profitability of 259 commercial banks in four major economies of South Asia using the GMM estimator for the period of 1997-2012. They found that financial solvency, managerial efficiency, and inflation were positively correlated with profitability. On the other hand, variables like cost of fund, liquidity, funding gap, term structure of interest rate and economic growth had negative impact.

Boateng (2018) conducted a comparative study on 20 India and Ghana-based banks (10 banks from each country) using the multiple regression method. According to the study, macroeconomic and bank-specific variables like credit risk, net interest margin, liquidity, capital adequacy ratio, bank size, etc., had a remarkable impact on the profitability measure (return on asset) of Indian and Ghanaian banks. However, bank size and cost to income ratio had a significant effect on Ghana's profitability rate and comparatively insignificant influence in terms of India.

Özsarı, et al. (2018) conducted their research on 13 post-Soviet countries using the Generalized Method of Moments and panel regression. They found a positive relationship of economic growth and non-interest bank loan with profitability and a negative association of loan-to-GDP with profitability.

Bangladesh studies

Quality academic literature on the Bangladesh banking sector profitability determinants is rather limited in supply. Even within that limited pool, most of the studies took a bank-

specific view while only a few added a macroeconomic lens in addition to the bank-specific variables. A study by Mondol and Wadud (2022) analyzing Bangladeshi commercial banks (2009–2018) examined profitability determinants using ROA, ROE, and NIM as measures. Consistent with international evidence, the study found that capital adequacy and asset structure positively impacted profitability, while bank size and liquidity have a negative effect. Among macroeconomic factors, GDP growth negatively affected ROA and NIM, whereas inflation positively influenced NIM.

Islam and Rana (2017) conducted their study on 15 selective private banks of Bangladesh using panel data focusing on internal variables affecting bank profitability measures. They find a strong negative impact of operating expenses and nonperforming loans (NPL) on bank profitability, which is consistent with evidences from other countries. Mahmud et al. (2016) conducted a study covering bank-related data for the 2003-2013 period and found size, operating expenses ratio, and gearing ratio to negatively affect profitability.

Using the Generalized Method of Moments (GMM) for a 2006-2013 panel data set, Rahman et al. (2015) conclude that capital and loan intensity have positive, and cost efficiency and off-balance sheet activities have a negative relationship with bank profitability.

Taking a 2012-2016 dataset of the top 15 private commercial banks in Bangladesh by asset size, Hossain and Ahamed (2015) find that bank earnings, asset quality, management efficiency, capital strength, size, and asset structure have a significant impact on bank profitability. In another study, Ahamed (2021) found a positive correlation between liquidity and profitability using the annual data for 2005-2018.

Sufian and Habibullah (2009) took data from 1997 to 2004 and analyzed it using the Least Squares and Fixed Effect model. They find a negative correlation between profitability and a bank-specific variable (bank size) and a macroeconomic variable (inflation). Sufian and Kamarudin (2012) reported variables like bank's capital levels and size, management efficiency, liquidity, non-traditional activities, inflation, GDP growth, and concentration of banking sector etc. to be influential in explaining bank profitability.

Therefore, the research gap is pretty evident: There exists virtually no robust study covering the recent periods that combines all the three types of determinants of bank profitability for the Bangladeshi banking sector.

METHODOLOGY

Data

The study investigates the relationship between bank profitability and bank-specific, industry-specific, and macroeconomic variables. The data is collected from the annual financial statements of the banks listed in the Dhaka Stock exchange for the period of 2005-2023, which are available in the Bangladesh Securities and Exchange Commission library. The macroeconomic information is retrieved from the Bangladesh Bureau of Statistics, Bangladesh Bank, IMF Financial Statistics, and World Bank database. Data of 23 banks with large market shares for the years 2005 to 2023 has been used, giving 437 bank-year observations.

Econometric Model

Panel data has been used to measure the cross-section units' variability and dynamic change over time. A pooling analysis allows obtaining more consistent estimates of the parameters where the association between the variables is stable through cross-section units. Pooled Ordinary Least Square (POLS) Method displays the general quality of minimized bias and variance, which is considered the most consistent regression estimation. Demirguc-Kunt and Huizinga (1999); Short (1979); Bourke (1989); Molyneux and Thorton (1992); Menicucci and Paolucci (2015) use the simple linear equation model to analyze the relationship with profitability.

To identify the relationship between the profitability of bank and the bank-specific, industry-specific and macroeconomic variables we estimate the following linear regression model:

$$Y_{ij} = \alpha + \beta_1 NII_{ij} + \beta_2 DPST_{ij} + \beta_3 OPEX_{ij} + \beta_4 CAPR_{ij} + \beta_5 LTAR_{ij} + \beta_6 SIZE_{ij} + \beta_7 MKT_{ij} + \beta_8 INF_{ij} + \beta_9 GDP_{ij} + \beta_{10} EXH_{ij} + \epsilon$$

In this equation *i* refers to a specific bank, *j* refers to a year, Y_{ij} refers to bank profitability and is the observation of bank *i* in a particular year *j*. and ϵ is a normally distributed random variable disturbance term or error term with zero variance.

Dependent variable(s)

In the literature, three measures of profitability, such as Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM), are used and expressed as a function of the internal and external determinants.

Return on Assets (ROA) shows the profit of the company over its assets. It measures the efficiency of utilizing assets to generate income for a company. ROA is a better measure of the ability of the firm to generate returns on its portfolio of assets. ROA is used to identify the operational performance, competence, and efficiency of a bank. ROA is used by many researchers in previous literatures.

Return on Equity (ROE) measures the amount of income a company generates against its equity. It explains how effectively managing a company is using the shareholders' equity capital to earn profit. ROE does not account for financial leverage, so the ratio tends to be higher than the ROA. ROE measures how successful a company uses its investment funds to cause earnings growth.

The net Interest Margin (NIM) variable is calculated by dividing the net interest income by the total assets. The net interest income is found by subtracting the total interest expense from the total interest income. NIM is a good measure of profitability as it shows the interest profit earned by the bank by using funds of the depositors and shareholders.

Table 2: Variables

Variables		Measure	Proxy	Hypothesized Relationship
Dependent Variable				
ROA	ROA	Net Profit/Total Asset	Profitability	N/A
ROE	ROE	Net Profit/Total Equity		N/A
NIM	NIM	Net Interest Margin/Total Asset		N/A
Independent Variables				
Bank-specific Variables				
NII Ratio	NII	Non-interest Income/Total Asset	Earnings	+
DPST Ratio	DPST	Total Deposit/Total Asset	Asset Structure	+
OPEX Ratio	OPEX	Operating Expense/Total Asset	Management Efficiency	+/-
CAP Ratio	CAPR	Total Equity/Total Asset	Capital Strength	+
LTA Ratio	LTAR	Loans and advance/ Total Asset	Liquidity	+/-
Industry-specific Variables				
SIZE	SIZE	Natural Logarithm of Total Asset	Industry Impact	+/-
MKTSHARE	MKT	Bank Asset/Total Banking Asset	Market Share	+/-

Macroeconomic Variables				
INF Rate	INF	Inflation Rate	Inflation	+/-
GDP Growth	GDP	GDP growth rate	Economics Growth	+/-
REX Rate	EXH	Exchange Rate	Real Exchange Rate	+/-

Independent variables

Internal determinants involve the factors influenced by the bank management's decisions, efficiency, policy, and objectives. The external determinants can be comprised of both industry and macroeconomic variables that display the banks' economic, legal, and competitive environments. The independent variables fall into three categories of bank-specific variables, industry-specific variables, and macroeconomic variables. All these variables have an independent effect on the profitability of the bank.

1. Bank specific variables:

The bank-specific variables include earnings, asset structure, asset quality, management efficiency, liquidity, and capital strength. Non-interest income has been used to measure earnings. Operating expenditure, total deposit, nonperforming loans, outstanding loans, and shareholders' equity are used to measure the management efficiency, asset structure, asset quality, liquidity analysis, and capital strength, respectively. It is noteworthy that the bank-specific variables are scaled using comprehensive variables like Total Asset or Total Loans to create comparability of data for the sample banks.

Non-interest income is the proxy variable of earnings. Exchange and brokerage commission, fees, investment income, foreign exchange profit, service charge, dividend income, gain from the asset sale, etc., are considered the source of non-interest income. Deposit is the primary source of bank funding, so it is directly correlated with bank profitability. The deposits are used as a proxy of the bank asset structure. It shows the diversification of the assets of the banking business. The more the deposit amount, the higher the opportunity to earn profit by disbursing loans and advances. Nonperforming loans are considered loans and advances which do not generate any income for the bank. Bank must keep provisions from profit against the nonperforming loans. The loan loss provision reduces the distributable profit of the bank. The loan loss provisions reduce the liquidity and affect the disbursement ability of new loans and investments. Operating expense or the non-interest expense is the measurement of operational efficiency of the management. Equity is used as a proxy of total capital and defines the general safety and soundness of the financial institutions. Higher equity indicates the ability of the bank to absorb losses and handle significant threat and vulnerabilities arising from the business

operation. Large, capitalized banks are able to absorb shocks at different levels from various risk factors and perform well in the long run. Loans and Advances are the primary sources of earnings for the banks. Generally, Loans and Advances are less liquid than other asset components hence higher loans and advance to asset ratio implies less liquidity.

2. Industry specific variables:

Bank size variable is one of the crucial factors that impacts profitability. Several previous studies in empirical research found that size is a determinant of bank profitability. Large banks have strong capital and asset base which allows them to disburse more loans and invest in various securities. Greater market share increases efficiency, generate fund at lower costs and poses strong market power. However, excessively large size of a bank can lead to greater inefficiency and rise agency cost. Market Share ratio can be calculated by dividing the individual bank assets with the total banking asset. This variable identifies the effect of competition in the banking industry.

3. Macroeconomic variables:

Macroeconomic factors are considered as the signaling points of economic growth of the country. Macroeconomic variables influence by the government policy, regulations and other overseas factors. These elements are outside the control of the bank and can impact the whole industry to a large extent.

Gross Domestic Product (GDP) growth rate defines the how fast the economy is growing. GDP growth is the increase in the inflation-adjusted market value of the goods and services over the period. Positive GDP growth rate express the economic expansion and progress. Economic growth creates investment opportunities and allows the bank to expand the banking services. Inflation is considered as the sustained increase of price level over a period. Inflation is measured by the change in consumer price index. Inflation can increase the price of the factors of production and therefore raise the cost of business and reduces the profit. The real effective exchange rate is considered as the weighted average of a country's currency relative to the basket of other major currencies such as US Dollars, Euro, Pound and Yen. The real effective exchange rate adjusted for the effects of inflation.

Robustness Check

The basic estimation strategy is to pool the observation across banks and apply the regression analysis on the pooled sample. The study uses the least squares method of the random effects (RE) model where the standard errors are calculated by using White's 1980 transformation to control for cross sectional heteroskedasticity. The random effects model

has been chosen over fixed effects model by using the Hausman test (p-value > 0.05). In model one, two, and three, the p-value in the Hausman test is 0.0674, 0.0741, and 0.0789, respectively, which indicates we fail to reject the null hypothesis, meaning that the random effects model is appropriate and preferred over the fixed effects model.

Random Effects assumes that unobserved effects are uncorrelated with explanatory variables, but if this assumption is violated, omitted variable bias can persist. Several control variables have been used to capture unobserved heterogeneity and reduce the omitted variable bias. Random Effects assumes that regressors are uncorrelated with unobserved individual effects such as ($E[X_{it}u_i]=0$), meaning explanatory variables should not be correlated with the individual-specific effect, but simultaneity can violate this assumption, leading to biased coefficients. Durbin-Wu-Hausman (DWH) test has been conducted to identify the presence of endogeneity and the p-value > 0.05 confirms the absence of endogeneity. The RE model assumes that individual-specific effects are uncorrelated with explanatory variables. The results of the Hausman test confirm the absence of endogeneity and prefer RE.

The econometric model uses cluster robust standard errors (cluster at year- and bank-level) to make sure errors are uncorrelated across variables and time which fulfills the conditions of homoscedasticity and adjust for autocorrelation within groups. The Hausman test has been used to identify the randomness of the data, and the results favor Random Effect model over Fixed Effect which indicates individual-specific effects are random and uncorrelated with explanatory variables and addresses the cross-sectional Heterogeneity.

EMPIRICAL RESULTS AND DISCUSSION

In the study, a total of three models have been developed considering the endogenous variable ROA, ROE and NIM as proxy for profitability. The output from both the random effect model and pooled ordinary least square method depicts consistency, proving the robustness of the dataset. The strong R-squared and adjusted R-squared suggests that all three models explained most of the variation of bank specific, industry specific and macroeconomic variables.

Model One: Profitability Proxy ROA

In model one, POLS finds that non-interest income, capital ratio and bank size have positive relationship whereas deposit size, operating expense, loan outstanding, market share, inflation, GDP growth and exchange rate has negative relationship with ROA. However, among the explanatory variables non-interest income, capital ratio and GDP growth has significant relationship. In case of RE model non-interest income, operating expense,

capital, market share and bank size positively related with profitability whereas deposit size, loan outstanding, market share, inflation, GDP growth and exchange rate depicts negative relationship. RE models also finds non-interest income, capital ratio, and market share to be significant for return on assets.

Table 3: Model One Estimation Results

Variable	Pooled Ordinary Least Square	Random Effect Model
	0.1952**	0.1845**
NII	(0.0481)	(0.0409)
	-0.0003	-0.0084
DPST	(0.0097)	(0.0076)
	-0.0119	0.0574
OPEX	(0.0525)	(0.0432)
	0.0322**	0.0390**
CAPR	(0.0076)	(0.0065)
	-0.0011	-0.0016
LTAR	(0.0015)	(0.0018)
	-0.0318	-0.0954*
MKT	(0.0677)	(0.0407)
	0.0002	-0.0001
SIZE	(0.001)	(0.0010)
	0.0275	-0.0278
INF	(0.0282)	(0.0561)
	-0.1054*	-0.1011
GDP	(0.0517)	(0.1017)
	-0.0129	-0.0143
EXH	(0.0067)	(0.0131)

**1% Significance
*5% Significance

Table 4: Correlation Matrix of Variables with confidence intervals

	ROA	NII	DPST	OPEX	CAPR	LTAR	MKT	SIZE	INF	GDP
NII	0.28** [0.19, 0.37]									
DPST	-0.06 [-0.15, 0.04]	-0.11* [-0.20, -0.02]								
OPEX	0.13** [0.03, 0.22]	0.23** [0.14, 0.32]	-0.08 [-0.17, 0.01]							
CAPR	0.29** [0.20, 0.37]	0.06 [-0.03, 0.15]	-0.12* [-0.22, -0.03]	0.01 [-0.08, 0.11]						
LTAR	-0.05 [-0.15, 0.04]	-0.04 [-0.14, 0.05]	0.07 [-0.02, 0.17]	-0.11* [-0.20, -0.02]	-0.07 [-0.16, 0.03]					
MKT	-0.13** [-0.22, -0.04]	-0.04 [-0.13, 0.06]	0.06 [-0.04, 0.15]	0.04 [-0.05, 0.14]	0.02 [-0.08, 0.11]	-0.11* [-0.20,-0.01]				
SIZE	-0.19** [-0.28, -0.10]	-0.09 [-0.18, 0.00]	0.20** [-0.29, -0.11]	-0.05 [-0.15, 0.04]	0.01 [-0.08, 0.10]	-0.06 [-0.16,0.03]	0.19** [0.10,0.28]			
INF	0.12* [0.03, 0.21]	0.08 [-0.01, 0.18]	0.09 [-0.00, 0.18]	0.04 [-0.06, 0.13]	0.05 [-0.04, 0.14]	-0.01 [-0.11,0.08]	-0.01 [-0.10,0.09]	-0.22** [-0.31,-0.13]		
GDP	-0.14** [-0.23, -0.05]	-0.06 [-0.15, 0.04]	-0.06 [-0.15, 0.03]	-0.01 [-0.11, 0.08]	-0.04 [-0.14, 0.05]	0.03 [-0.06,0.12]	0.00 [-0.09,0.10]	-0.22** [-0.31,-0.13]	-0.09 [-0.18,0.00]	
EXH	-0.23** [-0.32, -0.14]	-0.11* [-0.21, -0.02]	-0.21** [-0.30, -0.12]	-0.08 [-0.17, 0.01]	0.02 [-0.07, 0.11]	-0.05 [-0.14, .05]	0.02 [-0.07,0.11]	0.81** [0.78,0.84]	-0.18** [-0.27,-0.09]	0.09 [0.00,0.18]

**1% Significance *5% Significance

Model Two: Profitability Proxy ROE

The empirical results suggests that non-interest income, deposit size and inflation have positive association whereas operating expense, capital ratio, loan outstanding, market share, bank size and GDP growth has negative correlation with ROE under both POLS and RE model. POLS method finds operating expense to have inverse relation but RE model finds it positively associated. Non-interest income and market share identified to be significant under both methods, but loan outstanding and inflation is significant just under POLS model.

Table 5: Model Two Estimation Results

Variable	Pooled Ordinary Least Square	Random Effect Model
	1.3312*	1.999**
NII	(0.6630)	(0.570)
	0.2227	0.0667
DPST	(0.1331)	(0.1060)
	-0.0355	0.5069
OPEX	(0.7241)	(0.6112)
	-0.1976	-0.0364
CAPR	(0.1053)	(0.0906)
	-0.0428*	-0.0378
LTAR	(0.0216)	(0.0208)
	-2.3176*	-1.697*
MKT	(0.9322)	(0.4994)
	-0.0012	-0.0003
SIZE	(0.0077)	(0.008)
	0.9224*	0.8964
INF	(0.3887)	(0.4089)
	-0.5638	-0.4778
GDP	(.7126)	(0.7478)
	-0.1294	-0.1488
EXH	(0.0922)	(0.0968)

**1% Significance
*5% Significance

Table 6: Correlation Matrix of Variables with confidence intervals

	ROE	NII	DPST	OPEX	CAPR	LTAR	MKT	SIZE	INF	GDP
NII	0.21** [0.12, 0.30]									
DPST	0.04 [-0.05, 0.14]	-0.11* [-0.20,-0.02]								
OPEX	0.09 [-0.00, 0.18]	0.23** [0.14,0.32]	-0.08 [-0.17,0.01]							
CAPR	-0.01 [-0.10, 0.09]	0.06 [-0.03,0.15]	-0.12* [-0.22,-0.03]	0.01 [-0.08,0.11]						
LTAR	-0.06 [-0.15, 0.04]	-0.04 [-0.14,0.05]	0.07 [-0.02, 0.17]	-0.11* [-0.20,-0.02]	-0.07 [-0.16,0.03]					
MKT	-0.17** [-0.26, -0.08]	-0.04 [-0.13,0.06]	0.06 [-0.04,0.15]	0.04 [-0.05,0.14]	0.02 [-0.08,0.11]	-0.11* [-0.20,0.01]				
SIZE	-0.19** [-0.28, -0.10]	-0.09 [-0.18,0.00]	-0.20** [-0.29,-0.11]	-0.05 [-0.15,0.04]	0.01 [-0.08,0.10]	-0.06 [-0.16,0.03]	0.19** [0.10,0.28]			
INF	0.16** [0.07, 0.25]	0.08 [-0.01,0.18]	0.09 [-0.00,0.18]	0.04 [-0.06,0.13]	0.05 [-0.04,0.14]	-0.01 [-0.11,0.08]	-0.01 [-.10,0.09]	-0.22** [-0.31,-0.13]		
GDP	-0.07 [-0.17, 0.02]	-0.06 [-0.15,0.04]	-0.06 [-0.15,0.03]	-0.01 [-0.11,0.08]	-0.04 [-0.14,0.05]	0.03 [-0.06,0.12]	0.00 [-.09,0.10]	-0.22** [-0.31,-.13]	-0.09 [-0.18, 0.00]	
EXH	-0.20** [-0.29, -0.11]	-0.11* [-0.21, -0.02]	-0.21** [-0.30,-0.12]	-0.08 [-0.17,0.01]	0.02 [-0.07,0.11]	-0.05 [-0.14,0.05]	0.02 [-.07,0.11]	0.81** [0.78,0.84]	-0.18** [-0.27, 0.09]	0.09 [-0.00, 0.18]

**1% Significance *5% Significance

Model Three: Profitability Proxy NIM

The POLS methods exhibit that non-interest income operating expense, market share and GDP growth has positive relationship with NIM whereas deposit size, capital ratio, loan outstanding, bank size and inflation has negative relation. The results from RE model

suggest that non-interest income operating expense, capital, market share, loan outstanding and GDP growth is positively associated with profitability where deposit size, bank size and inflation have negative relation. POLS method finds that non-interest income, market share, bank size, inflation and exchange rate is significant for profitability. In RE model non-interest income, operating expense, bank size, inflation and exchange rate proving to be significant.

Table 7: Model Three Estimation Results

Variables	Pooled Ordinary Least Square	Random Effect Model
	0.9484**	0.9807**
NII	(0.0215)	(0.0192)
	-0.0024	-0.0038
DPST	(0.0043)	(0.0035)
	0.0296	0.0497*
OPEX	(0.0234)	(0.0206)
	-0.0003	0.0024
CAPR	(0.0034)	(0.0031)
	-0.0003	0.0001
LTAR	(0.0007)	(0.0007)
	0.0359**	0.0020
MKT	(0.0302)	(0.0168)
	-0.0018**	-0.0018**
SIZE	(0.0002)	(0.0003)
	-0.0251*	-0.0265*
INF	(0.0125)	(0.0132)
	0.0370	0.0411
GDP	(0.0231)	(0.0242)
	0.0007*	0.00068*
EXH	(0.0030)	(0.0031)

**1% Significance
*5% Significance

Table 8: Correlation Matrix of Variables with confidence intervals

	NIM	NII	DPST	OPEX	CAPR	LTAR	MKT	SIZE	INF	GDP
NII	0.92** [0.90,0.93]									
DPST	-0.09 [-0.18,0.00]	-0.11* [-0.20,-0.02]								
OPEX	0.25** [0.17,0.34]	0.23** [0.14,0.32]	-0.08 [-0.17,0.01]							
CAPR	0.06 [-0.03,0.16]	0.06 [-0.03,0.15]	-0.12* [-0.22,-0.03]	0.01 [-0.08,0.11]						
LTAR	-0.03 [-0.13,0.06]	-0.04 [-0.14,0.05]	0.07 [-0.02,0.17]	-0.11* [-0.20,-0.02]	-0.07 [-0.16,0.03]					
MKT	-0.08 [-0.17,0.01]	-0.04 [-0.13,0.06]	0.06 [-0.04,0.15]	0.04 [-0.05,0.14]	0.02 [-0.08,0.11]	-0.11* [-0.20,-0.01]				
SIZE	-0.27** [-0.35,-0.18]	-0.09 [-0.18,0.00]	-0.20** [-0.29,-0.11]	-0.05 [-0.15,0.04]	0.01 [-0.08,0.10]	-0.06 [-0.16,0.03]	0.19** [0.10,0.28]			
INF	0.08 [-0.02,0.17]	0.08 [-0.01,0.18]	0.09 [-0.00,0.18]	0.04 [-0.06,0.13]	0.05 [-0.04,0.14]	-0.01 [-0.11,0.08]	-0.01 [-0.10,0.09]	-0.22** [-0.31,-0.13]		
GDP	0.05 [-0.05,0.14]	-0.06 [-0.15,0.04]	-0.06 [-0.15,0.03]	-0.01 [-0.11,0.08]	-0.04 [-0.14,0.05]	0.03 [-0.06,0.12]	0.00 [-0.09,0.10]	-0.22** [-0.31,-0.13]	-0.09 [-0.18,0.00]	
EXH	-0.22** [-0.31,-0.13]	-0.11* [-0.21,-0.02]	-0.21** [-0.30,-0.12]	-0.08 [-0.17,0.01]	0.02 [-0.07,0.11]	-0.05 [-0.14,0.05]	0.02 [-0.07,0.11]	0.81** [0.78,0.84]	-0.18** [-0.27,-0.09]	0.09 [-0.00,0.18]

**1% Significance *5% Significance

Analysis

There are slight differences in the results of the models generated due to the differences in the calculation of endogenous variables. The ROA and ROE is calculated adjusted for the operational, administrative, and financing expenses whereas NIM is just the gross revenue. Although all the endogenous variables are proxy of profitability measurement, the calculation process and variances affected the relationship with explanatory variables.

Non-interest income is a supplementary source of earnings for the banks apart from the interest income. The results in all three models show that the non-interest income has a

strong relation to boost the earnings of the bank. Efficient allocation in resources in this segment can enhance earnings as well as profitability. Our results align with findings from Sufian and Kamarudin (2012), which indicates that non-interest income is a significant driver of bank profitability in Bangladesh. As the financial sector matures and regulatory constraints tighten, banks may increasingly rely on fee-based services and remittances to sustain profitability.

The operating expenses such as expansion of brank's branches, recruiting extra manpower for better services, aggressive sales and marketing etc. can drive the costs up while boosting earnings at the same time. The understanding here is that most of the expenses incurred at the bank level are utilized for improvement on the services of the bank which in turn earns profit. The results have generated mix behavior due to the operating differences in the bank level. Some banks focus on cost reduction strategies whereas most of them focuses on aggressive revenue generation policies. This finding implies that Bangladeshi banking sector is yet to reach a maturation stage.

Strong capital base and higher equity creates the ground for broad investment base and also support banks from the potential losses from risky investments. Greater investments and loan disbursement can generate elevated revenue for the banks. The ROE model shows negative association between the profitability of the banks and capital availability. This is known as 'base effect' as in the ROE calculation equity is used as denominator. Higher equity leads to lower ROE ratio while holding everything else constant. Even though bank capital negatively influences ROE, but, in the long run, banks will perform better. This is because there is an improvement in core bank businesses (increase in net interest margin and better earnings of assets) resulting in higher profitability.

The asset structure and investment diversification determine the earning trend and growth opportunities. Holding substantial funds can reduce the loanable funds and create liquidity excessiveness. The cost of equity is higher than the costs of other sources of financing which can drag the profit downwards. In the theoretical bank profit model composition of all outstanding loans and the survivor rate of these loans accounts for majority of profits. Higher outstanding loans and advances also enhance the chances of greater non-performing loans and provision requirement. Thus, overall balance between loan outstanding and non-performing loan ratio is a key element in profitability.

The models exhibit mixed results in market size and higher market share association with profitability indicators. Large bank size and higher market share provide access to higher liquidity, investments, and financing facilities. However, contrary to Market Power Theory,

our findings suggest that higher market share does not lead to higher profitability in Bangladesh. This could be attributed to increased regulatory compliance costs for larger banks, operational inefficiencies, and exposure to higher non-performing loans. Larger banks and market leaders generally face complex new regulations and low growth opportunities in the industry which decreases marginal profit. Costs are reduced only slightly as bank size increases and that large banks often encounter scale inefficiencies due to lower level of management, bureaucratic and other reasons. Bank size is important in the sense that it reduces earnings volatility and large banking sector improves banking profitability.

Inflation seems to have both positive and negative correlation with the bank profitability. A potential explanation for this finding is that the ability to pass the costs of inflation onto customers. Another explanation is that the deposit rates and lending rates are quickly adjusted as a reaction to the increase in inflation. However, the operational, administrative, and financing costs increases exponentially with the rise in inflation rate. The competitiveness in the industry may not allow banks to pass the whole inflation burden to the customers rather carry some of their own. The fact that inflation is negatively associated with net interest margin implies that banks had to bear some inflation costs.

The GDP growth is found to be significantly and negatively related to bank profitability models, contrary to a lot of established economic theories. This may be due to increased competition (supporting, at least partially, the view that high economic growth improves business environment and lowers bank entry barriers – increasing loanable funds and therefore reducing lending rate and bank revenues). Another plausible explanation is the regulator-imposed interest rate caps limiting profit margins, and a higher proportion of riskier loans during economic booms. Higher GDP growth is associated with inflation and can produce collaborative effect on profitability.

The negative relationship between ROE and ROA with exchange rate implies that the devaluation of exchange rate accounts for a direct positive change in bank profits. The argument in this instance is that returns to the banking system come through equity investments in foreign exchange transactions. On the other hand, the positive relationship between exchange rate and NIM indicates that interest earning transactions were susceptible to changes in the currency exchange fluctuations at least in the positive sense.

Discussion

This research is a continuation of the study Hossain and Ahamed (2015) with a broader scope of updated data and additional parameters. The study reveals both similarities and

variations in the results with previously literatures in various countries. Bangladesh is a developing country that has strict regulations and some limitations in the banking industry. The banking sector environment in Bangladesh has differences with other countries in terms of economic variability, regulations, and industry nature.

The study uses data for 437 bank year observations which is quite large for similar kinds of research in Bangladesh. The number of variables used in the study has surpassed the previous studies over Bangladesh banking sector. These broad number of variables helped to identify the unobservable characteristics and variations of profitability that were missing in the prior studies. The relation within and among the variables doesn't create any endogeneity and results are free from any kind of biasness. The results have provided different perspective to the researchers to work on the variables and explore further interactions.

Conclusion

The study examined the relationship between bank profitability and a comprehensive list of bank-specific, industry-specific and macroeconomic variables using unique panel data from 23 Bangladeshi banks with large market shares from 2005 to 2023 employing the Pooled Ordinary Least Square (POLS) Method for regression estimation. The random effect model was used to check for robustness. Three variables (ROA, ROE, and NIM) were used as bank profitability proxies following standard literature. It was concluded that non-interest income, capital ratio, market share, bank size, GDP growth, and real exchange rates were significant to differing degrees in explaining the profitability of the sampled Bangladeshi banks.

The major policy implication of this study is that in a regimented industry where price competition is not a viable source of competitive advantage, empirical test results exhibit that efficient allocation of resources to a supplementary source of earnings, non-interest income, can significantly enhance earnings as well as profitability. Banks that will pursue this income-source diversification strategy will be a gainer in the longer term and receive favorable ratings from investors and analysts. Large bank size and higher market share provide access to higher liquidity, investments, and financing facilities. Although this study found the mixed direction of the sign of the predictor variable, larger banks and market leaders generally face complex new regulations and low growth opportunities in the industry, which decreases marginal profit. This finding has important implications for managers running banking operations in Bangladesh as they navigate through the new regulations-growth nexus in a way that optimizes profitability. Business environment variables such as GDP growth and exchange rate can affect supply and demand shock,

affecting profitability. Therefore, policymakers in charge of the country's macroeconomic management, especially the central bank, need to formulate economic growth-focused policies and manage the real exchange rate that works in favor of bank profitability.

Although the deposit is hypothesized to be positively correlated with profits, this study revealed that not all the deposits are profitable for the banks. A proxy for managerial efficiency, operating expenses such as the expansion of brank's branches, recruiting extra workforce for better services, aggressive sales and marketing, etc. can drive the costs up while boosting earnings at the same time. Higher capital and equity provide a cushion against adverse financial conditions. The cost of equity is higher than the costs of other sources of financing, which can drag the profit downwards. Higher outstanding loans and advances also enhance the chances of greater non-performing loans and provision requirements. Thus, the overall balance between loan outstanding and non-performing loan ratio is an element in profitability. Holding substantial funds can reduce the loanable funds and create liquidity excessiveness. However, interestingly, none of the three profitability proxies was affected by the liquidity variable in the current context. It is consistent with a previous study by Hossain and Ahamed (2015) that concluded that this phenomenon indicates Bangladeshi banks not pursuing systematic and modern Balance Sheet management strategies.

Finally, although this study provided a strong foundation in understanding the determinants of Bangladeshi banks' profitability, it has its limitations. There are some structural issues rather unique to the Bangladeshi banking industry like the six-nine interest rate regime that existed during April 2020 and May 2024, absence of natural functioning of the market forces in allowing poorly performing banks to go bankrupt or merge with banks with stronger fundamentals, exogenous influence on the bank management in disbursing low-quality assets etc. that need to be tackled separately to better understand the issue at hand. This is a crucial direction for future studies.

Declaration statements

On behalf of all authors, the corresponding author states that there is no conflict of interest. The authors also declare no competing interests. The authors didn’t receive any grant or funding for this research. The research doesn’t contain any human subjects or animals. All data are collected from the primary sources with the approval from relevant authority.

References

Acaravci, S. K., and Çalim, A. E. (2013). “Turkish Banking Sector’s Profitability Factors,” *International Journal of Economics and Financial Issues*, Vol. 3, No. 1, pp. 27-41.

Ahamed, F. (2021). Determinants of Liquidity Risk in the Commercial Banks in Bangladesh. European Journal of Business and Management Research, 6(1), 164-169.

Ali, M., & Puah, C. H. (2018). The internal determinants of bank profitability and stability: An insight from banking sector of Pakistan. Management Research Review.

Alison, P.D. (2005). "Fixed Effects Regression Methods for Longitudinal Data: Using SAS," *SAS Institute*

Al-Jarrah, M., Ziadat, N. and El-Rimawi, Y. (2010). "The determinants of the Jordanian's Banks profitability: A cointegration approach", *Jordan Journal of Business Administration*, Vol. 6, No. 2, pp. 247-261.

Alp, A., Ban, U., Demirgunes, K., and Kilic, S. (2010). "Internal determinants of profitability in Turkish banking sector," *ISE Review*, 12(46), pp. 1-14.

Islam, M. A., & Rana, R. H. (2017). Determinants of bank profitability for the selected private commercial banks in Bangladesh: A panel data analysis. *Banks & bank systems*, (12,№ 3 (cont.)), 179-192.

Belke, M., Unal, E.A. (2017). Determinants of bank profitability: evidence from listed and non-listed banks in Turkey. *Journal of Economics, Finance and Accounting (JEFA)*, Vol.4, Iss.4, p.404-416.

Ben Naceur, S., and Goaied, M. (2008). "The determinants of commercial bank interest margin and profitability: Evidence from Tunisia," *Frontiers in Finance and Economics*, 5(1), pp. 106-130.

Bhatia, A., Mahajan, P., and Chander, S. (2012). "Determinants of profitability of private sector banks in India," *Indian Journal of Accounting*, 42(2), pp. 39-51.

Boateng, K. (2018). Determinants of Bank Profitability: A Comparative Study of Indian and Ghanaian Banks. Canara Bank School of Management Studies, Bangalore University, India, 5(5).

Bolarinwa, S. T., Obembe, B. O., & Olaniyi, C. (2019). Re-examining the determinants of bank profitability in Nigeria. Journal of Economic Studies, 633–645.

Demirguc-Kunt, A., and Huizinga, H. (1999). "Determinants of commercial bank interest margins and profitability: Some international evidence," *The World Bank Economic Review*, 13, pp. 379-408.

Dietrich, A. and Wanzenried, G. (2009). "Determinants of bank profitability before and during the crisis: evidence from Switzerland", *Journal of International Financial Markets, Institutions and Money*, Vol. 21 No. 3, pp. 307-327.

Garcia-Herrero, A., Gavila, S., and Santabarbara, D. (2009), "What explains the low profitability of Chinese banks?" *Journal of Banking and Finance*, 33(11), pp. 2080-2092.

Goddard, J., Molyneux, P., and Wilson, H. O. S. (2004), "Dynamics of growth and profitability in banking," *Journal of Money, Credit, and Banking*, 36, pp. 1069-1090.

Growe, G., DeBruine, M., Lee, J. Y., and Maldonado, J. F. T. (2014), "The Profitability and Performance Measurement of U.S. Regional Banks Using the Predictive Focus of the "Fundamental Analysis Research"" *In Advances in Management Accounting*; pp. 189-237.

Gul, S., Irshad, F., and Zaman, K. (2011), "Factors affecting bank profitability in Pakistan," *The Economics*, 20, pp. 1851-1866.

Hasan, M. S. A., Manurung, A. H., & Usman, B. (2020). Determinants of Bank Profitability with Size as Moderating Variable. *Journal of Applied Finance & Banking*, Vol. 10, No. 1, p-153-166.

Hasanov, F. J., Bayaramli, N., and Al-Musehel, N. (2018). Bank-Specific and Macroeconomic Determinants of Bank Profitability: Evidence from an Oil-Dependent Economy. *International Journal of Financial Studies*, 6(3).

Hassan, M.K and Bashir, A-H.M. (2003). "Determinants of Islamic Banking Profitability," *Paper presented at the Economic Research Forum (ERF) 10th Annual Conference, Marrakesh-Morocco*, 16-18 December.

Hossain, M. S., & Ahamed, F. (2015). Determinants of bank profitability: A study on the banking sector of Bangladesh. *Journal of Finance and Banking*, 13(1), 43-57.

Islam, M. S., & Nishiyama, S. I. (2016). The determinants of bank profitability: dynamic panel evidence from South Asian countries. *Journal of Applied Finance and Banking*, 6(3), 77.

Jonathan. B., and Xuan, V. V. (2019) Determinants of Bank Profitability—Evidence from Vietnam, *Emerging Markets Finance and Trade*, 55:6, 1417-1428.

Kawshala, H., and Panditharathna, K. (2017). The Factors Effecting on Bank Profitability. *International Journal of Scientific and Research Publications*, 7(2).

Kosmidou, K., (2006). "The Determinants of Banks' Profits and Margins in Greece during the period of EU financial integration," *Managerial Finance.*

Kosmidou, K., Tanna, S., and Pasiouras, F. (2005). "Determinants of profitability of domestic UK commercial banks: Panel evidence from the period 1995-2002". *Money Macro and Finance (MMF) Research Group Conference* (Vol. 45).

Lee, C. C., and Hsieh, M. F. (2013). "Beyond bank competition and profitability: Can moral hazard tell us more?" *Journal of Financial Services Research,* 44(1), 87-109.

Liu, H. and Wilson, J. O. S. (2010). "The profitability of banks in Japan," *Applied Financial*

Macit, F. (2012). "Bank specific and macroeconomic determinants of profitability: Evidence from participation banks in Turkey," *Bulletin*, 32(1), pp. 586-595.

Mauricio Jara-Bertin, José Arias Moya, Arturo Rodríguez Perales, (2014). "Determinants of bank performance: evidence for Latin America," *Academia Revista Latinoamericana de Administración*, Vol. 27 Issue: 2, pp.164-182.

Menicucci, E., and Paolucci, G. (2016). "The determinants of bank profitability: Empirical evidence from European banking sector," *Journal of Financial Reporting and Accounting*, Vol. 14 Issue 1, pp. 86-115.

Mondol, D. K., & Wadud, A. (2022). Determinants of profitability of commercial banking in Bangladesh: A panel analysis. *International Journal of Statistical Sciences*, 22(1), 115-143.

Obamuyi, T. M. (2013). "An analysis of the deposits and lending behaviours of banks in Nigeria," *International Journal of Engineering and Management Sciences*, pp. 46–54.

Pasiouras, F., and Kosmidou, K. (2006). "Factors influencing the profitability of domestic and foreign banks in the European Union," *Research in International Business and Finance*. *Romanian Economic Journal*, 14, pp. 61-87.

Qamruzzaman, M., Jianguo, W. Financial innovation and economic growth in Bangladesh. *Financ Innov* 3, 19 (2017). https://doi.org/10.1186/s40854-017-0070-0

Rahman, M., Hamid, M., and Khan, M. (2015). Determinants of Bank Profitability: Empirical Evidence from Bangladesh. *International Journal of Business and Management*, Vol. 10, No. 8.

Saeed, M. S. (2014). "Bank-related, industry-related and macroeconomic factors affecting bank profitability: A case of the United Kingdom," *Research Journal of Finance and Accounting*, 5(2), pp. 42-50.

Sahyouni, A., and Wang, M. (2018). The determinants of Bank Profitability: Does Liquidity Creation matter? *Journal of Economics and Financial Analysis*, Vol.2, 61–85.

Shaeba, D. M. R., and Zergaw, L. N. (2017). Bank Specific, Industry Specific and Macroeconomic Determinants of Bank Probability in Ethiopia. *International Journal of Advanced Research in Management and Social Sciences*, Vol.6, No.3.

Shoaib N., Wang S., Jaleel A., and Peng K. (2015). "Determinants of bank's profitability in Pakistan: A latest panel data evidence," *International Journal of Economics, Commerce and Management,* Vol. III, Issue 4.

Sufian, F. (2011). "Profitability of the Korean banking sector: Panel evidence on bank-specific and macroeconomic determinants," *Journal of Economics and Management*, 7(1), pp. 43-72.

Sufian, F., and Habibullah, M. S. (2009). Bank specific and macroeconomic determinants of bank profitability: Empirical evidence from the China banking sector. *Frontiers of Economics in China*, Vol. 4(2), p-274-291

Sufian, F., and Chong, R. R. (2008), "Determinants of bank profitability in a developing economy: Empirical evidence from Philippines," *Asian Academy of Management Journal of Accounting and Finance*, 4(2), pp. 91-112.

Sufian, F., and Habibullah, M. S. (2009), "Determinants of bank profitability in a developing economy: Empirical evidence from Bangladesh," *Journal of Business Economics and Management*, 10(3), pp. 207-217.

Sufian, F., & Kamarudin, F. (2012). Bank-specific and macroeconomic determinants of profitability of Bangladesh's commercial banks. *The Bangladesh Development Studies*, 1-28.

Sufian, F., and Noor, M. A. N. M. (2012), "Determinants of bank performance in a developing economy does bank origins matters?" *Global Business Review*, 13(1), pp. 1-23.

Yüksel, S., Mukhtarov, S., Mammadov, E., and Özsarı, M. (2018). Determinants of Profitability in the Banking Sector: An Analysis of Post-Soviet Countries. Economies 2018, 6(3).