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A Panel Analysis On Macroeconomic And Bank-Specific Determinants Of Commercial Bank's Profitability In A Developing Economy: Evidence From Bangladesh

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Abstract:
Background*: This study focuses on the banking sector in Bangladesh, a critical component of the country's economy. Its primary goal is to explore the influence of macroeconomic and bank-specific determinants on the profitability of commercial banks in Bangladesh. Although banks are essential to financial stability and economic progress, there is a clear lack of research that thoroughly examines macroeconomic determinants as well as bank-specific determinants in the context of Bangladesh. This study aims to bridge this gap by examining a range of factors such as Capital Adequacy, Credit Risk, Liquidity, Bank Size, Core Deposit, GDP, Inflation, and Real Interest Rates and their impact on Return on Asset (ROA) and Return on Equity (ROE).*
Data: *This study utilizes a balanced panel dataset from 15 commercial banks in Bangladesh, spanning a 10-year period from 2013 to 2022. This approach involves repeated observations over time, enabling an in-depth analysis of trends and patterns. Bank-specific data was sourced from the financial statements of the banks, while macroeconomic variables were gathered from the World Bank's website.*
Results*: Using the fixed effect regression model, the study identifies that among the bank-specific determinants: Liquidity, Capital Adequacy, and Credit Risk significantly impact bank profitability through ROA. Higher liquidity and Credit Risk levels negatively affect returns, while strong Capital Adequacy positively affects ROA. Among the macroeconomic determinants GDP and Inflation positively affect ROA which are also statistically significant. Bank size and inflation have a positive impact on ROE which are statistically significant.*
Conclusion: *The study emphasizes how crucial bank-specific and macroeconomic factors are in determining a bank's profitability in Bangladesh. It offers significant insights for policymakers and future research areas, suggesting that banks should maximize liquidity and credit risk management and maintain high capital adequacy in order to boost profitability.*
Key Word*: Profitability; Macroeconomic; Bank-specific; Commercial Banks; Determinant; Indicators*

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I. Introduction

The banking sector is a fundamental part of any economy including Bangladesh. It plays a crucial role in promoting economic growth and maintaining financial stability. Understanding how both the macroeconomic factors and bank-specific factors affect the profits of commercial banks is vital for creating effective policies and ensuring the financial well-being of these institutions. A strong and profitable banking system is essential for the overall stability of a country's economy, and profitability is a key indicator of its effectiveness.

In Bangladesh, there has been an ongoing discussion about how macroeconomic factors and factors specific to banks impact the profitability of commercial banks. Additionally, there have been questions about how to practically apply these factors when making policies. Despite this ongoing conversation, few studies comprehensively examine both macroeconomic and bank-specific factors together, especially within the context of Bangladesh.

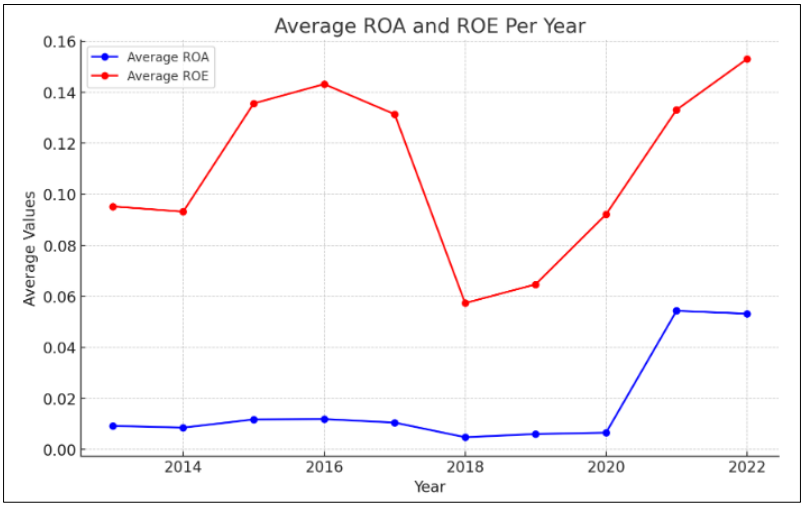
This study aims to fill this research gap by analyzing how macroeconomic and bank-specific factors influence the profitability of commercial banks in Bangladesh. The study covers the years 2013 to 2022 and includes financial data from fifteen commercial banks operating in the country. To analyze this data, we use a statistical technique known as the Fixed Effects Model for regression analysis.

Specifically, we investigate the roles of Capital Adequacy, Credit Risk, Liquidity, Bank Size, Core Deposit, Gross Domestic Product (GDP), Inflation, and Real interest rates as variables of interest. Profitability is measured using Return on Assets (ROA) and Return on Equity (ROE) which are widely accepted metrics in the banking industry.

This study recognizes that different research findings have emerged regarding the impact of macroeconomic and bank-specific determinants on commercial bank profitability. By addressing these variations, we aim to provide valuable insights that can guide policymakers, regulators, and industry stakeholders in Bangladesh. These insights will contribute to informed policymaking aimed at improving the profitability and stability of the commercial banking sector.

The goal of this study is to make a significant contribution to the ongoing discussion about the performance of commercial banks in Bangladesh. We aim to align our insights with the economic realities of the country and consider their implications for its financial future.

Figure 1: Trends of average ROA and ROE in the commercial banks in Bangladesh for the period 2013 -2022



II. Literature Review

Profitability is a vital concern for commercial banks worldwide. Understanding the factors that influence bank profitability is crucial for financial analysts, policymakers, and stakeholders in the banking sector. This literature review examines research on the determinants of bank profitability, with a focus on the impact of macroeconomic and bank-specific factors on commercial banks. The studies reviewed here cover various countries and time periods, providing valuable insights into the complex dynamics of bank profitability.

Macroeconomic Factors and Bank Profitability: Kiganda (2014) examined the profitability of commercial banks in Sub-Saharan Africa (SSA), with a focus on Kenya and Equity Bank [1]. This study highlighted the higher average returns on assets in Sub-Saharan Africa compared to other regions and the lack of consensus in existing studies regarding the impact of macroeconomic factors on bank profitability in Kenya. The study's findings indicate that macroeconomic factors such as real GDP, inflation, and exchange rates have an insignificant effect on bank profitability, emphasizing the importance of internal management factors in determining bank profitability in Kenya.

Jamal et al. (2012) investigated the factors influencing the profitability of domestic and foreign commercial banks in Malaysia from 2004 to 2011 [18]. This study focused on macroeconomic factors such as inflation, interest rates, GDP growth, and stock market development. The findings reveal that inflation, interest rates, and GDP growth positively impact all commercial banks' return on assets (ROA), while stock market development negatively influences bank profitability. Interestingly, interest rates have a positive effect on foreign bank profitability but no significant impact on domestic bank performance.

Akhter et al. (2023) extended this line of research to Bangladesh, conducting a panel data regression analysis to explore the relationship between bank-specific and macroeconomic factors and bank profitability [19]. The study utilized panel data regression analysis, conducting tests for cross-sectional dependence, unit roots, and cointegration to assess the relationships among variables. The study considered factors such as inflation rates, and exchange rates. The findings demonstrated that these macroeconomic factors significantly affected bank profitability.

Vejzagic et al. (2014) investigated the impact of macroeconomic factors on the profitability of commercial banks in Malaysia, focusing on return on assets (ROA). The study utilized a standard regression model and considered factors like real GDP growth, inflation (measured by the consumer price index), and real interest rates [20]. The analysis covers seven banks over the period from 1995 to 2011, examining the relationship between these macroeconomic determinants and profitability for both the average of all banks and individual banks. The results show that real GDP growth is significant and positively related to profitability for the average of all banks, as well as for Maybank, Public Bank, and Hong Leong Bank, with a high confidence level. In contrast, inflation

(CPI) is not significant for the average of all banks but has a significant negative relationship with profitability for Public Bank and Hong Leong Bank.

Bank-Specific Factors and Bank Profitability: A significant body of literature investigates bank-specific factors that impact profitability. Al-Homaidi et al. (2018) employed a panel data analysis covering more than 60 banks over 10 years [17]. The study investigated bank-specific factors (such as size, asset quality, capital adequacy, and more) to profitability indicators like ROA, ROE, and NIM. The findings reveal that various bank-specific factors significantly influence profitability, while macroeconomic factors have a negative impact on Indian commercial banks' profitability. Notably, factors like bank size, assets management ratio, number of branches, and leverage ratio play crucial roles in determining profitability in this context.

Athanasoglou et al (2008) examined the impact of various factors on bank profitability, including bank-specific, industry-specific, and macroeconomic determinants, using the structure-conduct-performance (SCP) hypothesis as a framework [2]. The research employs a GMM technique to analyze data from Greek banks spanning from 1985 to 2001. The findings suggest that profitability persists moderately, indicating that market structures may not deviate significantly from perfect competition. Bank-specific factors, except for size, have a significant influence on profitability as expected.

Bhattaraj et al. (2018) investigated the performance of commercial banks in Nepal from 2011 to 2016. They found that the profitability of these banks is primarily influenced by their cost efficiency in managing loan assets, with lower costs leading to higher profitability [3].

Ashraf et al. (2017) examined the impact of bank-specific and macroeconomic factors on the profitability of commercial banks in Asian countries from 2008 to 2015, using regression analysis [4]. The findings reveal that both bank-specific and macroeconomic determinants significantly affect bank profitability, with larger asset sizes contributing to increased profitability, while leverage has a negative impact and liquidity has a positive impact. Overall, the study underscores the importance of considering these factors to enhance bank management efficiency and profitability in Asian banking institutions.

Yuan et al. (2022) investigated the determinants of profitability in private commercial banks in Asian countries, focusing on Bangladesh and India. Using data from 2010 to 2021, the study found that factors such as Bank Size (BS) and Debt to Asset Ratio (DAR) positively impact Return on Asset (ROA), while Deposit to Asset Ratio (DTAR) and Loan to Deposit Ratio (LDR) have a negative influence on ROA [5].

Masood et al. examined (2015) the determinants of bank profitability in selected Organization of Islamic Cooperation (OIC) member states from 2007 to 2012. Employing a balanced panel data regression model, the research reveals that larger asset size and efficient expense management by bank management contribute to higher Return on Assets (ROA) [6]. Additionally, the study demonstrates a positive relationship between effective management of operating expenses and bank profitability in the OIC countries.

Weersainghe and Perera [7] in 2013 used Return on Asset (ROA) and Return on Equity (ROE) as the dependent variable for profitability indicators for the period 2001 to 2011 in Sri Lanka. They found out that bank size has a positive relationship with profitability due to economies of scale. However, liquidity and operating cost efficiency are negatively related.

Growe et al. (20140 utilized the GMM estimator technique to examine the profitability and performance of U.S. regional banks between 1994 and 2011 [8]. Findings reveal that while factors like the efficiency ratio and provisions for credit losses impact profitability, these relationships change when assessing changes in profitability, and macroeconomic variables, particularly the yield curve slope, exhibit lagged effects on bank earnings.

Anbar et al. (2011) investigated the factors influencing bank profitability in Turkey between 2002 and 2010 by analyzing both bank-specific and macroeconomic determinants [9]. Using balanced panel data, the research finds that larger asset sizes and non-interest income positively impact bank profitability, while a larger credit portfolio and loans under follow-up have a negative effect.

Karim et al. (2010) investigated the factors influencing the profitability of Islamic banks in Africa from 1999 to 2009 using panel data analysis [10]. The study reveals that bank-specific factors such as capital and size contribute positively to profitability, while credit risk and operating efficiency have a negative impact.

Nisar et al.(2015) employed a Pooled Ordinary Least Square (POLS) regression model on financial data from all Pakistani banks for the period spanning 2006 to 2013 [12]. The study finds that factors such as funding cost, liquidity, non-performing loans, and administrative expenses have a negative impact on profitability.

Alfadli and Rjoub determined the impact of bank-specific, industry-specific, and macroeconomic variables on commercial bank financial performance in Gulf Corporation Council countries [12]. They considered panel data for 62 commercial banks from 2011 to 2017 and they applied the PCES technique. They found that the coefficient of capital adequacy ratio positively affects bank performance. On the other hand, efficiency, credit risk, diversification, and concentration ratio affect negatively on performance measures.

Aspal et al. in 2019 tried to find the significance of macroeconomic and bank-specific factors in Indian private-sector banks [13]. They used panel data for 20 private commercial banks for the period 2008 to 2014. They found that capital adequacy ratio affects return on assets negatively, asset quality also affects profitability

negatively, management efficiency also affects profitability negatively, earning quality affects profitability positively, and liquid assets affect profitability positively.

Yilmaz in 2013 measured the profitability of the banking system in Turkey from an emerging market by taking data from 195 banks for the period 2005 to 2010 and he used panel data analysis by taking Return on Asset (ROA) and Net Interest Margin (NIM) as the independent variable [14]. From this study, he found that liquidity risk, operating expense management, capitalization for banks, and ownership structure affect both return on asset and net interest margin positively. On the other hand, credit risk affects return on assets and net interest margin negatively.

In 2016 Yakubu investigated the influence of bank-specific and macroeconomic factors on commercial banks' profitability in Ghana [15]. He worked with the data from 2010 to 2015 on five commercial banks and used the least square regression model for analysis. He found out that bank size, liquidity, asset management, capital adequacy, expense management, and real interest rate have positive effects on the profitability of commercial banks. But only bank size liquidity and expense management are significant at a 5% level.

Similarly, Topak et al. (2017) investigated the determinants of commercial bank profitability in Turkey from 2005 to 2015 employing a balanced panel dataset covering 43 one-year periods during this time frame [16]. The study found that bank-specific factors such as net interest margin, fees and commissions revenues, and bank size positively impact profitability, while credit risk, capital adequacy, and operating expenses have negative effects. Notably, controlling operating expenses is identified as a crucial factor in enhancing bank profitability, given limited control over interest rates.

The Context of Bangladesh: Within the context of Bangladesh, Ullah et al. (2022) examined the financial performance of Islamic banks and state-owned commercial banks in Bangladesh from 2015 to 2019 [21]. Using panel data analysis, it identifies key determinants of banks' performance, with Return on Equity (ROE) as the dependent variable and factors such as total assets, capital adequacy, and liquidity as significant contributors for both types of banks. They also found that the credit-to-deposit ratio does not significantly impact performance in either category. Islamic banks demonstrate a greater ability to influence their ROE compared to state-owned commercial banks, suggesting a competitive advantage in Bangladesh's banking sector.

Sufian et al. (2012) examined factors influencing profitability in Bangladesh's banking sector from 2000 to 2010 using data from 31 commercial banks [22]. They used multiple regression analysis with a fixed effect model, validated by the Hausman test. The study identifies five significant bank-specific determinants affecting profitability, including capitalization, non-traditional activities, liquidity, management quality, and bank size. Additionally, the study reveals those three macroeconomic factors—GDP growth, inflation, and market concentration—significantly impact bank profitability during this period.

Majumder et al. (2017) investigated the determinants of profitability for four nationalized banks in Bangladesh from 2010 to 2014, considering eight variables related to risk, capital regulation, liquidity, income diversification, bank size, non-traditional activities, GDP growth, and inflation, with profitability measured by return on assets (ROA) [23]. Using SPSS software and various financial ratios, the study finds that bank-specific factors such as capital regulation, income diversification, and inflation are positively and significantly associated with ROA, while risk, liquidity, bank size, and non-traditional activities are negatively and significantly associated with ROA.

In 2017 Islam et al. considered Return on equity as a measure of profitability for analyzing the determinants of commercial banks' profitability in Bangladesh by taking a sample of 11 commercial banks for the period 2014 and 2015 and found that loan amount has a positive effect and non-performing loan has a negative effect on bank's profitability and credit risk is negatively related with commercial bank's profitability in Bangladesh [24].

Rahman et al. 2015 observed the impact of specific factors on the profitability of Islamic banks in Bangladesh from 2009 to 2013 [25]. Employing linear multiple regression analysis and using data from eight Islamic banks' annual reports, they found that bank size and deposits have a significant negative impact on profitability (measured by ROA), while equity has a positive significant impact. However, loan and expense management do not appear to significantly affect the profitability of these banks.

III. Methodology

Data Collection: In this study, we examined a sample from 15 commercial banks in Bangladesh for the period 2013 to 2022. A balanced panel dataset approach is used, which involves repeated observations of the same entities over time, thus allowing for a comprehensive view of trends and patterns. For the bank-specific variables, the data is collected from the financial statements of commercial banks in Bangladesh. For the macroeconomic variables, the data is collected from the website of the World Bank.

Variables:

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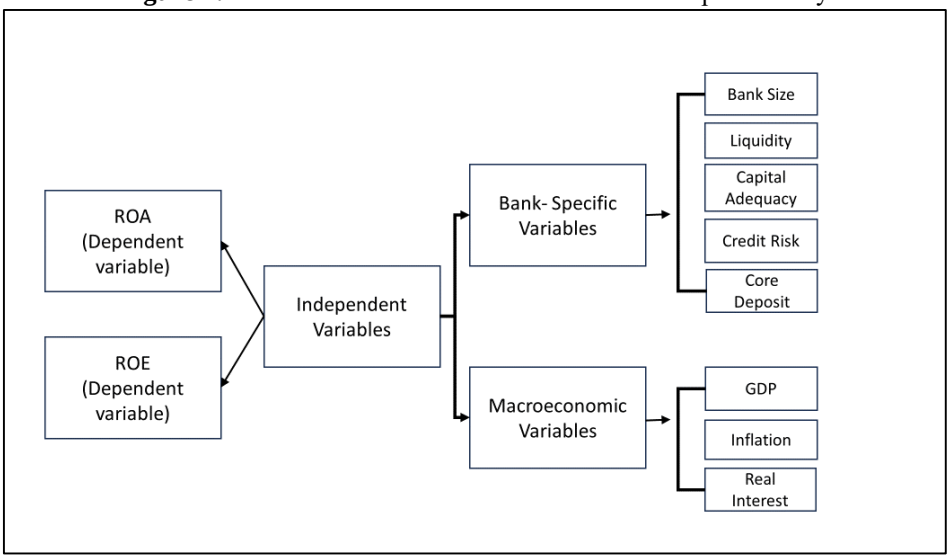
Figure 2: Variable frameworks of commercial bank's profitability



Dependent Variables:

Return on Asset (ROA): In this study, Return on Assets (ROA) is utilized as an indicator of bank profitability. ROA is calculated as the percentage of net profits after tax divided by total assets. This metric reflects the efficiency of a bank's management in using its assets to generate revenue. [26,27]

Return on Equity (ROE): In this study, Return on Equity (ROE) is also utilized as an indicator of bank profitability. ROE is calculated as the percentage of net profits after tax divided by total equity. This metric reflects the efficiency of a bank's management in using its equity to generate revenue.

Bank-specific Independent Variables:

Bank Size: The natural logarithm of total assets is often used as a measure of the bank size. It is generally expected that a bank's size will have a favorable effect on its profitability [9].

Liquidity: A bank's liquidity is a crucial component that indicates its capacity to meet its financial obligations. Maintaining a suitable amount of liquidity is crucial for banks because not doing so can lead to lower profits. [28,29]

Capital Adequacy: A basic indicator of a bank's capital sufficiency is the ratio of total capital to total assets. The capital adequacy ratio indicates a bank's ability to cover financial losses and maintain solvency. [30]

Credit Risk: Credit risk is determined by the ratio of total loans to total assets. If the ratio is high, there is a greater likelihood of defaulting on loans resulting in losses.[31]

Core Deposits: If the bank's total core deposit is high, it will increase the bank's profitability.

Macroeconomic Independent Variables:

GDP: Annual growth in gross domestic product is used as a measure of GDP. Normally positively affects banks' profitability [28].

Inflation: Inflation represents the rising pattern in the price of goods and services and is widely used in many studies in determining a bank's profitability [32,33]

Real Interest: The real interest rate is determined by subtracting the inflation rate from the interest rate. The real interest rate has a mixed effect on a bank's profitability [34,35].

Table 1: Variables Description

Variable Names	Measure
Return on Asset	Net profit after tax divided by total assets
Return on Equity	Net profit after tax divided by total equity
Bank size	Natural logarithm of total assets
Liquidity	Total Core deposit divided by total loan
Capital Adequacy	Total capital divided by total assets
Credit Risk	Total Loans divided by total assets
Core deposits	Core deposits
GDP	Percentage Growth in Gross Domestic Product
Inflation	Annual Inflation Rate
Real Interest	Annual Real Interest Rate

Model estimation: We used a fixed effect regression model in our analysis. Our model has been validated by the Hausman test result. Our equations are in the following:

ROA= α + β1 Bank size + β2 Liquidity + β3 Capital Adequacy + β4 Core deposits + β5 Credit Risk + β6 Real Interest + β7 GDP + β8 Inflation + ε (model 1.a)
And,
ROE= α + β1 Bank size + β2 Liquidity + β3 Capital Adequacy + β4 Core deposits + β5 Credit Risk + β6 Real Interest + β7 GDP + β8 Inflation + ε (model 1.b)

Hausman Test:

For our panel data analysis, we employed the Hausman test to decide which regression model to use: a fixed-effect regression model or a random-effect regression model. The Hausman test, as presented, is a statistical test used to compare two different estimators to determine if they are significantly different from each other. In econometrics, it's commonly used to choose between fixed effects (fe) and random effects (re) models in panel data analysis. In our model, the null hypothesis is that the random effect model is more appropriate and the alternate hypothesis is fixed effect model is more appropriate.
Test of H0: Difference in coefficients not systematic
chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)

Table 2: Hausman Test Result

	chi2(6)	Prob > chi2
Hausman test result for model (1.a)	48.04	0.00
Hausman test result for model (1.b)	31.23	0.00

The low p-value (0.0000) strongly suggests rejecting the null hypothesis of the Hausman test, which states that the differences in coefficients are not systematic. This implies that the fixed effects model is more appropriate for this data, as it provides consistent estimates under the alternative hypothesis (Ha), whereas the random effects model may not.

IV. Results and Discussions

Descriptive Statistics: The following descriptive statistics table summarizes the key variables:

Table 3: Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
ROA	150	0.01770	0.0851588	-0.0586737	0.7440683
ROE	150	0.11019	0.1205915	-0.75298	0.5387967
BankSize	150	246000000000	131000000000	2840000000	656000000000
Liquidity	150	1.115483	0.2028544	0.1462342	1.8964630
CapitalAde~y	150	1.34755	5.203580	0.0932831	49.42147
Coredeposits	150	188000000000	96100000000	1970000000	447000000000
CreditRisk	150	1.32834	5.4747	0.2432	52.7906
RealInt	150	0.02768	0.0566479	-0.1364214	0.0688587
GDP	150	0.06502	0.0115557	0.0344803	0.0788191
Inflation	150	0.06200	0.0083008	0.0551353	0.0769695

The descriptive table summarizes statistics for ten financial variables across 150 observations, offering insights into different aspects of banking and economic performance. ROA, ROE, indicating profitability, shows wide variation, averaging at 0.018 but ranging from -0.059 to 0.744. Bank size varies significantly, with average assets of 246 billion, ranging from 2.84 to 656 billion. Liquidity and Capital Adequacy both exhibit considerable variability, indicating differences in banks' short-term financial health and stability. Core Deposits average at 188 billion, but with substantial variation. Credit Risk also shows a broad range, reflecting diverse default risks in loan portfolios. Real Interest Rate and GDP Growth Rate exhibit moderate variability, reflecting changing economic conditions. Lastly, the Inflation Rate, while averaging at 0.062, shows relatively smaller fluctuations.

Correlation Matrix: The correlation matrix table examines the relationships between the dependent variable and independent variables: Bank Size, Liquidity, Capital Adequacy, Core Deposits, Credit Risk, Real Interest Rate, Gross Domestic Product (GDP), and Inflation. Each cell in the matrix represents the correlation coefficient between two variables, ranging from -1 (perfect negative correlation) to +1 (perfect positive correlation), with 0 indicating no correlation.

Table 4: Correlation Matrix of Model (1.a)

	ROA	BankSize	Liquid~y	Capita~y	Corede~s	Credit~k	RealInt	GDP	Inflat~n
ROA	1								
BankSize	-0.1879	1							
Liquidity	-0.1351	-0.2806	1						
CapitalAde~y	0.9887	-0.2125	-0.0816	1					
Coredeposits	0.2163	0.9049	-0.2674	0.1995	1				
CreditRisk	0.9859	-0.2136	-0.1216	0.9979	0.1964	1			
RealInt	-0.0159	0.0046	0.0108	-0.0065	0.0072	-0.0045	1		
GDP	0.0494	0.0037	-0.0656	0.0533	0.0224	0.0528	-0.206	1	
Inflation	0.0563	-0.1078	0.0676	0.0701	-0.0777	0.0785	0.2897	-0.0708	1

Overall, the correlations between independent variables indicate that while there are some relationships between these variables, they are generally weak, suggesting that these variables do not strongly influence each other in the data sample provided in the model (1.a). We can also find that ROA has a strong positive relationship with Capital Adequacy and Credit risk and on the other hand, a negative correlation with Bank Size and Liquidity. The correlation of ROA with macroeconomic determinants is weak in the correlation matrix table.

Table 5: Correlation Matrix of Model (1.b)

	ROE	BankSize	Liquid~y	Capita~y	Corede~s	Credit~k	RealInt	GDP	Inflat~n
ROE	1								
BankSize	0.1872	1							
Liquidity	-0.0675	-0.2806	1						
CapitalAde~y	-0.0092	-0.2125	-0.0816	1					
Coredeposits	0.1804	0.9049	-0.2674	0.1995	1				
CreditRisk	-0.0113	-0.2136	-0.1216	0.0979	0.1964	1			
RealInt	-0.116	0.0046	0.0108	-0.0065	0.0072	-0.0045	1		
GDP	0.0176	0.0037	-0.0656	0.0533	0.0224	0.0528	-0.206	1	
Inflation	0.0529	-0.1078	0.0676	0.0701	-0.0777	0.0785	0.2897	-0.0708	1

In the model (1.b), although there are some correlations between the independent variables, they are often weak, indicating that the variables do not have a significant influence on one another in the data sample given in the model (1.a). ROE has a positive correlation with Bank size and Core Deposit, GDP and Inflation, and a negative correlation with Liquidity, Capital Adequacy, Credit Risk, and Real Interest.

Fixed-Effect Regression Results:

Table 5: Fixed effect Regression Result of model (1.a) and (1.b)

Variables	Dependent Variable ROA [Model (1.a)]	Dependent Variable ROE [Model (1.b)]
Bank Size	-5.21e-14 (-0.85)	2.311* (0.32)
Liquidity	-.0408988* (-5.98)	.0597828 (0.73)
Capital Adequacy	.0306917* (8.74)	-.027257 (-0.65)
Core Deposits	3.45e-14 (0.41)	2.75e-13 (0.27)
Credit Risk	-.0145552* (-4.25)	.0256751 (0.63)
Real Interest	-.0137776 (-0.94)	.3066248 (-1.75)
GDP	.0725668* (1.05)	.0626555 (0.08)
Inflation	.041188* (1.12)	1.299605* (1.05)
Constant	.0520132 (4.86)	.0354481 (0.28)
R square Overall	0.9830	0.9075
Prob>F	0.0000	0.00

corr(u_i, Xb)	0.1841	0.1018

**Significant at a 5% significance level*

The fixed-effects regression analysis of the model (1.a), using data from 15 banks with 150 total observations, reveals substantial insights into factors affecting banks' Return on Assets (ROA). The high R-squared values (Overall: 0.9830) indicate that the model excellently explains the variance in ROA both within and across banks. The F-test for the significance of the group effects (banks) is significant (Prob > F = 0.0000), justifying the use of a fixed-effects model over a simple pooled OLS regression. The significant F-statistic confirms the model's overall statistical significance. The correlation between unobserved bank-specific effects and predictors in the regression model is 0.1841, indicating a relatively low correlation. This low correlation suggests that omitted variable bias, which can occur when important factors are left out of the model, is likely minimal in this case. Therefore, the model's findings regarding the impact of various predictors on Return on Assets (ROA) are more reliable, with reduced concern for bias from unobserved bank-specific characteristics.

In our results, among the bank-specific factors we found that Liquidity, Capital Adequacy, and Credit Risk affect a bank's profitability statistically significantly. Negatively impacts ROA (coefficient: -0.0408988), suggesting that higher liquidity levels might reduce profitability. Capital Adequacy positively influences ROA (coefficient: 0.0306917), indicating that better-capitalized banks tend to have higher returns. Credit Risk shows a negative effect on ROA (coefficient: -0.0145552), implying that higher credit risk is associated with lower profitability. KARAKAS et al. (2022) and Paul et al. (2021) also found that excess liquidity can negatively affect banks' profitability [36,37].

Topak et al. (2017) and Alfadli and Rjoub (2020) both indicated that credit risk has a negative impact on bank profitability [12,16]. Al-Homaidi et al. (2018) found that capital adequacy is a significant factor positively influencing bank profitability which matches our result [1].

Among the macroeconomic variables, GDP shows a positive relationship with ROA, having a coefficient of 0.0725668, which is significant at the 0.036 level and Inflation has a coefficient of 0.041188, indicating a positive association with ROA and is significant at the 0.009 level. Yuan et al. (2022) also suggested that factors like GDP positively impact Return on Asset (ROA) [5]. Jamal et al. (2012) found that inflation positively impacts all commercial banks' return on assets which confirms our result [18].

Other factors like Bank Size, Core Deposits, and Real Interest Rate don't have a significant impact on ROA as their influence is not strong or consistent enough to be statistically significant. These results are consistent with various studies that often find mixed or non-significant effects for factors like bank size and interest rates (e.g., Topak et al., Alfadli and Rjoub, Islam et al. [12,16,40]).

For model (1.b), high R-squared values (Overall: 0.9075) show that the model does a great job of explaining the variation in ROE within and between institutions. The F-statistic is significant (Prob > F = 0.000), indicating the model's explanatory variables collectively significantly predict the dependent variable, ROE. In the regression model, the correlation coefficient between predictors and unobserved bank-specific effects is 0.1018, suggesting a rather low correlation. As a result, the model's conclusions on how different variables affect Return on Assets (ROA) are less likely to be biased by unobserved bank-specific traits and are therefore more trustworthy.

Only Bank size and Inflation affect ROE statistically significantly. The coefficient of Bank Size is 2.3111, and it is statistically significant at the $p < 0.05$ level ($p = 0.032$). This suggests that an increase in bank size is positively associated with an increase in the Return on Equity (ROE). Kosmidou (2008) and Chen (2018) also found that bank size affects the profitability of commercial banks positively [41,42]. The positive coefficient of inflation (1.299605) indicates that higher inflation rates are associated with higher ROE. The positive coefficient of inflation confirms our result with Jamal et al. (2012) [18].

V. Conclusion

The paper provides a comprehensive understanding of the factors that affect bank profitability. The results of fixed-effects regression analysis on data from 15 banks, encompassing 150 observations have demonstrated that both macroeconomic and bank-specific factors play critical roles in determining a bank's Return on Assets (ROA) and Return on Equity (ROE) in Bangladesh. The robust fixed-effects regression model, with high R-squared values and significant F-statistics, provides reliable insights into these relationships. Bank-specific factors like Liquidity, Capital Adequacy, and Credit Risk are key determinants of Return on Assets (ROA). Specifically, higher Liquidity levels and Credit Risk negatively impact profitability, while better Capital Adequacy enhances it. Similarly, macroeconomic factors like GDP and Inflation positively affect ROA. On the other hand, among the bank-specific factors only Bank size is a key determinant of Return on Equity (ROE), and among the macroeconomic factors inflation positively affects ROE.

Considering these results, we recommend that commercial banks in Bangladesh focus on improving their liquidity levels and credit risk management to enhance profitability. Additionally, for best financial performance banks should continuously monitor and adjust their capital adequacy. Larger banks can benefit from economies

of scale. By expanding their operations, whether through opening new branches, diversifying into new financial services, or entering new markets, banks can spread their fixed costs over a larger revenue base, potentially increasing profitability. Policymakers and bank regulators should also consider the significant impact of macroeconomic factors like GDP and Inflation on banking operations. Future research could further explore the less significant factors such as Core Deposits, and Real Interest Rates to understand their effects on bank profitability. This comprehensive understanding of influencing factors will be vital for strategic decision-making in the banking sector.

References

[1]. Kiganda, E. O. (2014). Effect Of Macroeconomic Factors On Commercial Banks Profitability In Kenya: Case Of Equity Bank Limited. Journal Of Economics And Sustainable Development, 5(2), 46-56

[2]. Athanasoglou, P. P., Brissimis, S. N., & Delis, M. D. (2008). Bank-Specific, Industry-Specific And Macroeconomic Determinants Of Bank Profitability. Journal Of International Financial Markets, Institutions And Money, 18(2), 121-136.

[3]. Bhattarai, B. P. (2018). Impact Of Bank Specific And Macroeconomic Variables On Performance Of Nepalese Commercial Banks. Global Review Of Accounting And Finance, 9(1), 35-53.

[4]. Ashraf, M., Haider, Z., & Sarwar, M. B. (2017). Bank Specific And Macroeconomic Determinants Impact On Banks Profitability: Evidence From Asian Countries. International Journal Of Sciences: Basic And Applied Research, 33(3), 187-199.

[5]. Yuan, D., Gazi, M. A. I., Harymawan, I., Dhar, B. K., & Hossain, A. I. (2022). Profitability Determining Factors Of Banking Sector: Panel Data Analysis Of Commercial Banks In South Asian Countries. Frontiers In Psychology, 13, 1000412.

[6]. Masood, O., Ashraf, M., & Turen, S. (2015). Bank-Specific And Macroeconomic Determinants Of Bank Profitability: Evidence From Member States Of The OIC. Journal Of Islamic Financial Studies, 1(01).

[7]. Weersainghe, V. E. I. W., & Perera, T. R. (2013). Determinants Of Profitability Of Commercial Banks In Sri Lanka. International Journal Of Arts And Commerce, 2(10), 141-170.

[8]. Growe, G., Debruine, M., Lee, J. Y., & Tudón Maldonado, J. F. (2014). The Profitability And Performance Measurement Of US Regional Banks Using The Predictive Focus Of The "Fundamental Analysis Research". In Advances In Management Accounting (Pp. 189-237). Emerald Group Publishing Limited.

[9]. Anbar, A., & Alper, D. (2011). Bank Specific And Macroeconomic Determinants Of Commercial Bank Profitability: Empirical Evidence From Turkey. Business And Economics Research Journal, 2(2), 139-152.

[10]. Karim, B. K., Mohamed Sami, B. A., & Hichem, B. K. (2010). Bank-Specific, Industry-Specific And Macroeconomic Determinants Of Afrin Islamic Banks' Profitability. International Journal Of Business And Management Science, 3(1), 39-56.

[11]. Nisar, S., Susheng, W., Jaleel, A., & Ke, P. (2015). Determinants Of Bank's Profitability In Pakistan: A Latest Panel Data Evidence. International Journal Of Economics, Commerce And Management, 3(4).

[12]. Alfadli, A., & Rjoub, H. (2020). The Impacts Of Bank-Specific, Industry-Specific And Macroeconomic Variables On Commercial Bank Financial Performance: Evidence From The Gulf Cooperation Council Countries. Applied Economics Letters, 27(15), 1284-1288.

[13]. Aspal, P. K., Dhawan, S., & Nazneen, A. (2019). Significance Of Bank Specific And Macroeconomic Determinants On Performance Of Indian Private Sector Banks. International Journal Of Economics And Financial Issues, 9(2), 168.

[14]. Yılmaz, A. A. (2013). Profitability Of Banking System: Evidence From Emerging Markets. In WEI International Academic Conference Proceedings. Antalya.

[15]. Yakubu, I. N. (2016). Bank-Specific And Macroeconomic Determinants Of Commercial Banks Profitability In Ghana. International Finance And Banking, 3(2), 89-99.

[16]. Topak, M. S., & Talu, N. H. (2017). Bank Specific And Macroeconomic Determinants Of Bank Profitability: Evidence From Turkey. International Journal Of Economics And Financial Issues, 7(2), 574-584.

[17]. Al-Homaidi, E. A., Tabash, M. I., Farhan, N. H., & Almaqtari, F. A. (2018). Bank-Specific And Macro-Economic Determinants Of Profitability Of Indian Commercial Banks: A Panel Data Approach. Cogent Economics & Finance, 6(1), 1548072.

[18]. Jamal, A. A. A., Hamidi, M., & Karim, M. R. A. (2012). Determinants Of Commercial Banks' Return On Asset: Panel Evidence From Malaysia. International Journal Of Commerce, Business And Management, 1(3), 55-62.

[19]. Akther, T., Rahman, M., & Rahman, M. M. (2023). Factors Influencing Commercial Bank Profitability In Bangladesh: A Panel Data Approach. Future Business Journal, 9(1), 1-20.

[20]. Vejzagic, M., & Zarafat, H. (2014). An Analysis Of Macroeconomic Determinants Of Commercial Banks Profitability In Malaysia For The Period 1995-2011. Journal Of Asian Economy And Financial Review, 4(1).

[21]. Ullah, M. H., & Rahman, M. (2022). Financial Performance Comparison Between State-Owned Commercial Banks And Islamic Banks In Bangladesh. Journal Of International Business And Management, 5(3), 01-14.

[22]. Sufian, F., & Kamarudin, F. (2012). Bank-Specific And Macroeconomic Determinants Of Profitability Of Bangladesh's Commercial Banks. The Bangladesh Development Studies, 1-28.

[23]. Majumder, M. T. H., & Uddin, M. J. (2017). The Determinants Of Profitability Of Nationalised Banks In Bangladesh. International Journal Of Economics And Business Research, 13(4), 335-348.

[24]. Abate, T. W., & Mesfin, E. A. (2019). Factors Affecting Profitability Of Commercial Banks In Ethiopia. International Journal Of Research And Analytical Reviews, 6(1), 881-891.

[25]. Rahaman, M. M., & Akhter, S. (2015). Bank-Specific Factors Influencing Profitability Of Islamic Banks In Bangladesh. Journal Of Business And Technology (Dhaka), 10(1), 21-36.

[26]. Dietrich, A., & Wanzenried, G. (2011). Determinants Of Bank Profitability Before And During The Crisis: Evidence From Switzerland. Journal Of International Financial Markets, Institutions And Money, 21(3), 307-327.

[27]. Rivard, R. J., & Thomas, C. R. (1997). The Effect Of Interstate Banking On Large Bank Holding Company Profitability And Risk. Journal Of Economics And Business, 49(1), 61-76.

[28]. Rani, D. M., & Zergaw, L. N. (2017). Bank Specific, Industry Specific And Macroeconomic Determinants Of Bank Profitability In Ethiopia. International Journal Of Advanced Research In Management And Social Sciences, 6(3), 74-96.

[29]. Issn, V. O. L. N. O., Ebenezer, O. O., Ahmad, W., & Bin, W. (2017). Finance & Banking Studies Bank Specific And Macroeconomic Determinants Of Commercial Bank Profitability: Empirical Evidence From Nigeria. Journal Of Finance & Banking Studies, 6(1), 25-38.

[30]. Iss, W. U., Ugwunta, D. O., Ezeudu, I. J., & Ugwuanyi, G. O. (2012). An Empirical Assessment Of The Determinants Of Bank Profitability In Nigeria: Bank Characteristics Panel Evidence. Journal Of Accounting And Taxation, 4(3), 38-43.

[31]. Zhang, J., Jiang, C., Qu, B., & Wang, P. (2013). Market Concentration, Risk-Taking, And Bank Performance: Evidence From Emerging Economies. International Review Of Financial Analysis, 30, 149-157.
[32]. Masood, O., & Ashraf, M. (2012). Bank-Specific And Macroeconomic Profitability Determinants Of Islamic Banks: The Case Of Different Countries. Qualitative Research In Financial Markets, 4(2/3), 255-268.
[33]. Chowdhury, M. A. F., & Rasid, M. E. S. M. (2016). Determinants Of Performance Of Islamic Banks In GCC Countries: Dynamic GMM Approach. In Advances In Islamic Finance, Marketing, And Management: An Asian Perspective (Pp. 49-80). Emerald Group Publishing Limited.
[34]. Rashid, A., & Jabeen, S. (2016). Analyzing Performance Determinants: Conventional Versus Islamic Banks In Pakistan. Borsa Istanbul Review, 16(2), 92-107.
[35]. Tabash, M. I., Yahya, A. T., & Akhtar, A. (2017, December). Financial Performance Comparison Of Islamic And Conventional Banks In The United Arab Emirates (UAE). In International Conference On Advances In Business And Law (ICABL) (Vol. 1, No. 1, Pp. 477-494).
[36]. Ahmet KARAKAS & Melek ACAR, 2022. "The Effect Of Liquidity On Profitability In Commercial Banks: Evidence From Turkish Banking Sector," Journal Of BRSA Banking And Financial Markets, Banking Regulation And Supervision Agency, Vol. 16(2), Pages 139-171.
[37]. Sujan Chandra Paul & Probir Kumar Bhowmik & Mehbuba Nayan Famanna, 2021. "Impact Of Liquidity On Profitability: A Study On The Commercial Banks In Bangladesh," Advances In Management And Applied Economics, SCIENPRESS Ltd, Vol. 11(1), Pages 1-4.
[38]. Menicucci, E., & Paolucci, G. (2016). The Determinants Of Bank Profitability: Empirical Evidence From European Banking Sector. Journal Of Financial Reporting And Accounting, 14(1), 86-115.
[39]. Alfadli, A., & Rjoub, H. (2020). The Impacts Of Bank-Specific, Industry-Specific And Macroeconomic Variables On Commercial Bank Financial Performance: Evidence From The Gulf Cooperation Council Countries. Applied Economics Letters, 27(15), 1284-1288.
[40]. Islam, M. A., Sarker, M. N. I., Rahman, M., Sultana, A., & Prodhan, A. S. (2017). Determinants Of Profitability Of Commercial Banks In Bangladesh. International Journal Of Banking And Financial Law, 1(1), 1-11.
[41]. Kosmidou, K. (2008). The Determinants Of Banks' Profits In Greece During The Period Of EU Financial Integration. Managerial Finance, 34(3), 146-159.
[42]. Chen, Y. K., Shen, C. H., Kao, L., & Yeh, C. Y. (2018). Bank Liquidity Risk And Performance. Review Of Pacific Basin Financial Markets And Policies, 21(01), 1850007.

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