

# Impact of Bank Characteristics and Macroeconomic Factors on Banks' Profitability: A Study on Emerging Economy

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## Abstract

This study explores the impact of bank-specific characteristics and macroeconomic factors influence banks' profitability in an emerging economy. In order to evaluate the internal features of banks, the study takes into account a number of firm-level variables, such as the Liquidity Ratio, Loan-to-Deposit Ratio, Capital Adequacy Ratio, Investment Income, Non-Performing Loans, and Total Assets. The real interest rate, the GDP, and inflation as measured by the Consumer Price Index (CPI) are regarded as external macroeconomic variables. Return on Assets (ROA) and Interest Income are the two main metrics used to assess profitability. The research makes use of a panel data collection that includes 80 observations from 10 banks between 2014 and 2021. A multiple regression analysis is conducted to assess the impact of macroeconomic variables and bank-specific attributes on profitability. The findings demonstrate that capital adequacy ratio and investment income have large positive effects on profitability (ROA), whereas real interest rates, GDP, and non-performing loans have considerable negative effects. Liquidity, Loan-to-Deposit Ratio, Total Assets, and Inflation do not statistically significantly affect ROA.

**Keywords:** Liquidity Ratio, Loan-to-Deposit Ratio, Capital Adequacy Ratio, Investment Income, Non-Performing Loans, Total Assets, GDP.

## 1. Introduction

Banks serve a vital function in the economy. They act as financial intermediaries, accepting deposits and offering interest, while providing loans and advances at elevated interest rates. A successful and profitable bank contributes to a country's Gross Domestic Product (Owoputi et al., 2014). The banking sector in Bangladesh oversees the financial industry. Since gaining independence, Bangladesh has experienced careful growth in its banking system. This liberalization has introduced many new financial tools and developments in the sector. After the post-liberation period, the banks were nationalized to protect the institutions & the depositor's interest. The profitability of bank indicates that banks have bought a lot of dynamism and uncertainty in the economy (Daley & DaCosta, 2012). Banking sector plays an imperative role in an economy as it reveals the economic condition of a given country and for operating banking

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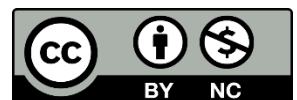
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sector profitability is essential (Riaz & Mehar, 2013). Bangladesh banking sector witnessed significant changes after the financial crisis in 2008 and crash in Bangladesh stock market in 2011 (Sufian & Kamaruddin, 2012). These changes result in improving the operational efficiency and profitability in the banking sector (Pradhan & Shrestha, 2016). In 2018, Bangladesh Economy reviewed that the growth of financial sector is 7.90 % in the outgoing fiscal year, which is lower compared to last fiscal year (9.12%) (New Age Bd. Sunday, November 11, 2018). It is necessary to know which elements affect the profitability in banking sector. Here the profitability is assessed using return on assets (ROA) as the key measure and Interest Income whereas, the elements that affect banks profitability can be categorized as corporate characteristics (internal factor) and macroeconomic factors (external factor) of a country. We are considering the variables like bank size, Non-performing loans, Investment Income, loan to deposit ratio, capital adequacy ratio & liquidity as corporate characteristics and gross domestic product, inflation as measured by CPI & real interest rate as macroeconomic indicators. The study represents, that both corporate characteristics and macroeconomic factors essentially explain the banking sector profitability of a country. So, this research is made to evaluate how corporate characteristics and macroeconomic factors affect the profitability of banking sector in Bangladesh.

The efficiency of Bank has an impact on the economic growth of a country. An economy with insolvent banks results in widespread crisis whereas a good profitability in banking sector has better ability to resist undesirable shocks and add to the stability in the financial system (Bhattarai, 2018). Firstly, unhealthy competition in banking industry is affecting the banks profitability. The bank executives are given high targets that encourages them to exercise bad practices (Dhaka Tribute, January 25th, 2018). Secondly, the bank sponsors have decided to provide maximum 6% on FDS (fixed deposit schemes). Beside this, the government has directed to involve inflation inside this 6%. This discourages the depositors to keep their savings in the banks on the other side, the depositors are investing their funds in National saving instruments as they are providing higher interest rate (The Daily Star, July 22, 2018). Lastly, according to AMA Muhith (Finance Minister), at present the banking sector is fragile because of irregularities and high Non-Performing Loans i.e., NPLs (Dhaka Tribute, November 18th, 2018). According to Bangladesh Bank, the volume of loan-defaults raised to Tk74, 303 crores as per December 2017. The Bangladesh bank data showed that if the top loan receiver become defaulters, a lot of banks will face big risk and the banks will be unable to protect their paid-up-capital. The research is intended to find the answer of the following questions.

- i. What will be the impact of Corporate Characteristics & Macroeconomic factors on ROA of the bank?
- ii. What will be the impact of Corporate Characteristics & Macroeconomic factors on Interest Income of the bank?

Examining the connection between corporate characteristics and macroeconomic variables and bank profitability is the main goal of this study.

- i. To determine the impact of Corporate Characteristics & Macroeconomic factors on ROA of the bank
- ii. To determine the impact of Corporate Characteristics & Macroeconomic factors on Interest Income of the bank

This study is trying to explore the challenges faced by the regulatory bodies and banks due to macroeconomic factors & corporate characteristics. The evidences and analysis to be conducted for the purpose of this study will help the policymakers to make better policies that will lead to better financial performance for the banks. This will also help the top management of Banks to take necessary steps for improving its profitability. Moreover, it will be able to contribute towards steady economic development. Although the whole banking sector is not considered, the evidences to be provided will give an overall picture about the topic. Therefore, outcomes of the study are expected to be beneficial to the concerned policy makers, stakeholders as well to the banking sector itself.

## **2. Literature Review**

Various academics have conducted diverse investigations about the impact of business attributes and macroeconomic variables on the profitability of banks. This chapter reviews the body of research, with a focus on studies that examine how corporate traits and macroeconomic factors affect bank profitability.

### **2.1. Banks's profitability**

Prior research on bank profitability has highlighted various factors that influence banks' performance across different global and regional contexts. Lamothe et al. (2024) conducted a comprehensive global analysis, identifying internal factors such as efficiency, capitalization, and impaired loans, and external factors like inflation and unemployment as key determinants of profitability. Similarly, Masrom et al. (2024) focused on corruption's minimal effect on bank profitability using machine learning models, indicating that although corruption impacts non-performing loans, it has a limited consequence on classification accuracy. The COVID-19 pandemic's influence was explored by Apergis (2024), who found a stronger convergence of profits among US banks, with non-performing loans and digital technology playing key roles during the pandemic. Belcaid and Al-Faryan (2024) studied Moroccan banks, revealing negative impacts of foreign ownership and high capital ratios on profitability, while domestic ownership and board independence positively affected performance. Lastly, Raftis et al. (2024) examined monetary policies, highlighting that operational efficiency and loan loss provisions are crucial for profitability across European nations, with some differences between developed and emerging markets. These studies collectively emphasize the importance of both internal management practices and external macroeconomic conditions in shaping bank profitability.

In addition to EPS (earnings per share) and net profit margin, the most commonly used measures for measuring profitability are ROA (return on assets) and ROE (return on equity). ROA decides how bank uses its investment resources to generate profit over the year (Sheeba, 2011). Higher ROA indicates higher performance while lower ROA indicates managerial inefficiencies. Bank profitability is best calculated by ROA (ILLO, 2012). A common method used by researchers to examine the financial industry's profitability is to utilize ROA as a dependent variable (Al-Homaidi et al. 2018, Almaqtari et al. 2019, Dsouza et al. 2022, Singh and Sharma 2016, Yüksel et al. 2018). ROE ranging from 15 to 20 % is a good sign for the banks (Sheeba, 2011). According to Masood and Ashraf (2012), return on equity (ROE) measures how well management uses shareholders' equity to produce net profit. The earnings that a lender makes by using its money or an investor makes from investing over time are referred to as interest income. In contrast to ROA and ROE, Heffernan and Fu (2008) contend that net interest margin (NIM) is a useful metric for calculating profitability. Chintha (2018) states that net interest margin places a strong emphasis on the profit made from spread income.

### **2.2. Corporate characteristics**

The corporate attributes of banks significantly influence their governance, performance, and social responsibility strategies. In their 2019 study, Matuszak et al. looked at how corporate governance characteristics affected the disclosures made by Polish banks on corporate social responsibility (CSR). They found that having a larger board, having female board chairmen, and having foreign board members had a favourable effect on CSR reporting. Tazilah et al. (2021) discovered that the inclusion of a Shariah Committee, board size, and independence all have a significant role in improving financial performance in Malaysian Islamic banks. Nurkhin et al. (2023) found that non-performing loans (NPF) were the primary factor impacting profitability in Indonesian Islamic banks, with corporate governance having no discernible effect on the performance of these banks. However, Ebimobowei (2022) showed that characteristics of corporate governance, such as ownership structure, gender diversity, and board independence, had a favourable impact on firm value in Nigerian banks, indicating that well-structured boards are associated with improved financial performance. Akhidime (2015) also highlighted the

importance of non-executive directors and board structure in ensuring high audit quality in Nigerian banks. When taken as a whole, these studies highlight how crucial board diversity, composition, and governance standards are to promoting ethical business practices and strong financial results in various banking systems.

The banks depend on the funds supplied by the public as deposits for providing loans to the customers. If banks' deposits increase more but their loans remain low, it results in decreased bank profit (Buyinza, 2010). The total asset of the bank represents its size. The effect of banks' size is reflected on their market shares, which enables them to attract more customers for providing loans that in turn affects their profit. In addition, the size of the banks enables them to control costs regarding product offerings and risk management (Rachdi, 2013). In order to issue credits to borrowers and ultimately produce a profit, banks need to maintain a particular amount of liquidity (Berríos, 2013). Loans that a bank is unable to collect the principle amount of or interest on are referred to as non-performing loans (NPL). Non-performing loans are a good way to gauge the quality of loans in any bank, claims Rasiah (2010). The capital adequacy ratio demonstrates the bank's capacity to maintain enough equity capital to meet depositor demands. Capital structure has been determined by Qin and Dickson (2012) to have a detrimental impact on profitability. Greater capital adequacy may also mean higher profitability if banks are able to avoid paying fixed interest charges; however, it may also mean worse profitability if investors are strong enough to make large investments in order to prevent future losses.

### **2.3. Macroeconomic indicators**

The stability and performance of banks are significantly influenced by macroeconomic factors, especially when it comes to non-performing loans (NPLs). In South Sumatra, Oktaviani and Yefriza (2024) looked at how macroeconomic variables including inflation, exchange rates, and central bank rates affected non-performing loans (NPLs). They found that although exchange rates had a positive impact on NPLs, inflation and the central bank rate had no effect. Fakhri and Nuriyah (2022) emphasised the necessity for creative banking solutions by highlighting the major disruption the COVID-19 epidemic made to macroeconomic indicators and Indonesia's performance of Islamic banks. Awijen et al. (2023) identified specific macroeconomic factors, such as profitability and specialization, that reduce sectoral default risks, while Arham et al. (2020) showed that unemployment and real interest rates significantly increase NPLs in emerging Asian economies. Similarly, Ozgur et al. (2021) used machine learning to demonstrate that macroeconomic and global factors play a nonlinear yet critical role in influencing bank lending behaviors in Turkey, underlining the importance of understanding these drivers for effective banking regulation and management. These studies collectively underscore the interconnectedness of macroeconomic variables and banking stability, especially in times of economic uncertainty.

Macroeconomic variables affect a vast population as opposed to a small number of people and are related to the larger economy (Oliver, 2000). The gross domestic product (GDP), which represents the total market value of goods and services generated over a certain period of time, is a useful indicator of a nation's economic success. Bank profitability may be impacted either favourably or unfavourably by changes in the national GDP (Saeed, 2014). Another important aspect affecting bank performance is inflation. Elevated loan interest rates and higher income are frequently correlated with high rates of inflation (ILLO, 2012). According to Bashir (2003), bank profitability can be positively impacted by projected inflation, while unexpected inflation typically has the reverse effect. A more accurate representation of the return on bonds or loans is given by the real interest rate, which accounts for inflation. The Consumer Price Index (CPI), which calculates the percentage change in the prices of a chosen basket of goods and services that consumers use, is a commonly used indicator of inflation. Based on the economic circumstances of a nation, bank profitability is impacted by both GDP growth rates and inflation rates, according to Alexiou and Sofoklis (2009). These variables could have a favourable influence on financial

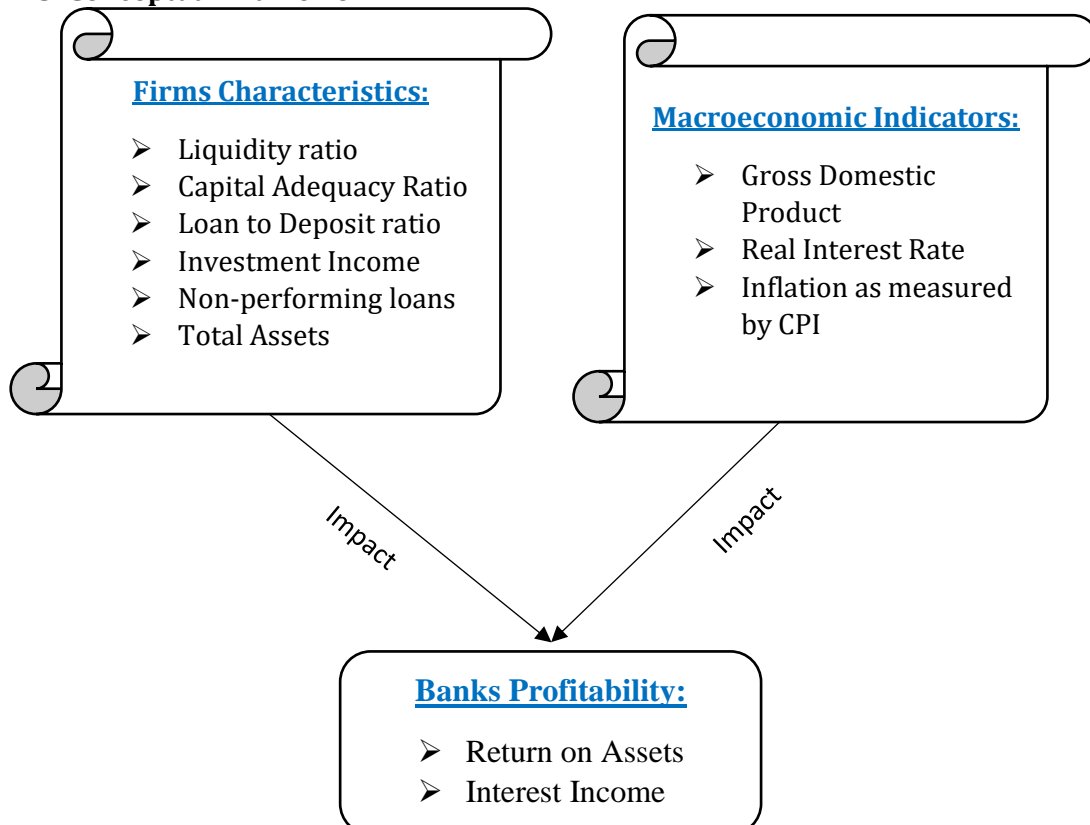
markets that are well-developed, but they might have the opposite effect in developing nations. Furthermore, interest rates contribute significantly to banks' revenue and often have a positive effect on their profitability (Saeed, 2014).

#### **2.4. Empirical studies**

A substantial positive association between bank size and profitability was discovered by Smirlock (1985), suggesting that larger banks are often more lucrative. A significant positive correlation between bank profitability and liquidity was shown by Bourke (1989). Interest rates, inflation rates, and bank profitability were shown to be significantly positively correlated in Molyneux and Thornton's (1992) study. Demirguc-Kunt and Huizinga (1999) used a linear regression study of commercial banks located in 80 different countries to find a little but beneficial effect of macroeconomic conditions on bank profitability. Increased real interest rates have the potential to boost loan interest rates and thus profitability; but, they may also have the unintended consequence of decreasing loan demand and profitability (Hassan & Bashir, 2003). In their analysis of five of the largest Islamic banks between 1984 and 2002, Haron and Azmi (2004) found that while real interest rates have an indirect link with ROA, inflation is directly correlated with ROA. Zeitun, Tian, and Keen (2007) discovered a negligible inverse correlation between business profitability and inflation. Yuqi (2008) proposed that banks' profitability is adversely affected by credit risk and liquidity. A strong positive association was found by Sufian and Chong (2008) between GDP and bank profitability. Bennaceur and Goaid (2008) found that the capital adequacy ratio had a positive influence on profitability, bank size had a negative impact, and macroeconomic factors had no discernible effect on profitability in Tunisia in their research of Tunisian banks from 1980 to 2000. Last but not least, Vong and Chan (2009) found that inflation had a significant impact on ROA based on a balanced panel data study of five major Macao banks. Real interest rates rising might help Islamic banks become more profitable, especially if direct investments account for a large amount of their revenue (Wasiuzzaman & Tarmizi, 2010). According to Vieira (2010), there is a short-term positive but modest association between return on assets (ROA) and liquidity. Dietrich and Wanzenried (2011) discovered a negative correlation between bank size and profitability. Using balanced panel data, Alpera and Anbarb (2011) investigated macroeconomic and bank-specific determinants influencing profitability in Turkey between 2002 and 2010. According to their research, non-interest revenue and bank size both significantly increase profitability, and real interest rates have a beneficial impact on bank performance. Sufian (2011) observed that whereas inflation had a favourable influence on ROA, GDP had a negative impact on 11 to 29 commercial banks in Korea between 1992 and 2003. Masood and Ashraf (2012) found that liquidity has little to no impact on profitability. Ayadi and Boujelbene (2012) found a negative correlation between bank profitability and inflation. After looking into a number of factors impacting Indian commercial banks between 2006 and 2011, Sharma and Mani (2012) came to the conclusion that GDP and inflation had little bearing on the banks' profitability. Zeitun (2012) used cross-sectional time series data to study macroeconomic factors impacting banks in Gulf Cooperation Council nations. He found that while inflation has a negative influence on profitability, GDP has a favourable one. Ongore and Kus (2013) discovered that while asset quality had a negative connection with financial performance and liquidity showed a poor association, capital sufficiency, asset quality, and managerial efficiency all had a substantial influence on the performance of commercial banks. Riaz and Mehar (2013) noted that interest rates and credit risk were only significant in relation to return on equity (ROE) in Pakistan, but bank size, the ratio of total deposits to total assets, credit risk, and interest rates all had a substantial impact on ROE. Francis (2013) discovered a negative correlation between inflation and GDP growth rates and bank profitability. In their 2014 study, Abdullah, Parvez, and Ayreen examined the macroeconomic, industry-specific, and bank-specific elements influencing profitability in Bangladesh between 2008 and 2011, using ROA and net interest margin (NIM) as metrics. Their findings showed that although non-performing loans had a negative impact on ROA but a positive impact on NIM, inflation had a substantial influence on NIM but not ROA. Noman et al. (2015) looked at 35 local banks in Bangladesh's profitability factors between 2003 and 2013.

They discovered that profitability was positively connected with liquidity, size, capital sufficiency, inflation, and stock market turnover, but adversely linked with cost effectiveness, credit risk, GDP growth, and real interest rates. Simiyu and Ngile (2015) conducted an analysis of Kenyan banks listed on the Nairobi Securities Exchange between 2001 and 2012 and came to the conclusion that real interest rates had a substantial detrimental impact on profitability. The study conducted by Pradhan and Shrestha (2016) examined the relationship between bank-specific and microeconomic factors in Nepal. The results indicated that bank-specific variables had a greater impact than macroeconomic ones, and that ROA and NIM were favourably impacted by capital sufficiency and managerial efficiency. Yakubu (2016) studied the commercial banks in Ghana between 2010 and 2015 and found that while GDP and inflation had negative correlations with profitability, bank size, capital adequacy ratio, liquidity, and real interest rates showed positive correlations. Bhattarai (2017) discovered a negative correlation between capital adequacy ratio and profitability when examining the impact of credit risk on the profitability of Nepalese commercial banks between 2009 and 2016. Ebenezer, Omar, and Kamil (2017) found that while the efficiency ratio had a negative impact on profitability, liquidity, capital adequacy, and GDP had a favourable impact on ROA and ROE in Nigeria. In their 2017 study, Topak and Talu examined Turkish commercial banks and discovered that while non-performing loans and capital adequacy ratios had a negative influence on profitability, the ratio of loan interest to deposit interest and firm size had a favourable impact. Combey and Togbenou (2017) looked at the short- and long-term correlations between important macroeconomic variables and the profitability of the banking industry. They discovered that while bank size and the capital-to-assets ratio had a beneficial impact on ROA, ROE and ROA were not related to macroeconomic factors in the short run. Over an extended period, there was a notable inverse link between GDP and ROA, although inflation had no effect on ROA. After examining the variables influencing the profitability of the Egyptian banking industry between 2006 and 2015, Abobakr (2018) came to the conclusion that higher operational income, better capital ratios, and bigger banks were all linked to higher profitability. The evaluations of the literature show that there are many unanswered questions about the factors influencing banks' profitability. In order to close the information gap, this study will look at how corporate traits and macroeconomic factors affect banks' profitability.

**2.5. Conceptual Framework**



By analysing the link between the independent variables—corporate characteristics and macroeconomic conditions—and the dependent variable—bank profitability—this study develops a conceptual framework. Interest income and return on assets (ROA) are used to measure profitability. The Liquidity Ratio, Investment Income, Loan-to-Deposit Ratio, Non-Performing Loans, Total Assets, and Capital Adequacy Ratio are used to assess corporate characteristics. GDP, the real interest rate, and inflation as measured by the Consumer Price Index (CPI) are the three main indicators of macroeconomic conditions.

**3. Research Methodology**

Eleven variables—two of which are dependent and the other nine are independent—are used to investigate the impact of business attributes and macroeconomic circumstances on bank profitability. The two portions of independent variables are comprised of six variables each for firm characteristics and three variables each for macroeconomic indicators. The below process is employed in order to yield a satisfactory outcome:

**3.1. Research Design**

As this research investigates the relations between the variables, which are in these case corporate characteristics, macroeconomic factors and banks’ profitability, so here we have adopted a descriptive research design. This type of research is used to describe the phenomenon and its characteristics (Hossein, 2015). Beside this we also applied Correlation and Linear Regression method. By using these methods, we can measure the variables of this study over the years.

**3.2. Source of Data**

Eleven factors are used to examine how company qualities and macroeconomic conditions affect bank profitability, with two of the variables being dependent and the remaining nine being independent. Three variables each for macroeconomic indicators and six variables each for company characteristics make up the two sections of independent variables. The following procedure is used to get a result that is satisfactory:

**Table-1: The Study Sample**

Observation	Name of Banks	Study Period
8	The City Bank Limited	2014-2021
8	Eastern Bank Limited	2014-2021
8	AB Bank Limited	2014-2021
8	Dutch Bangla Bank Limited	2014-2021
8	Bank Asia Limited	2014-2021
8	NCC Bank Limited	2014-2021
8	IFIC Bank Limited	2014-2021
8	Mercantile Bank Limited	2014-2021
8	BRAC Bank Limited	2014-2021
8	Pubali Bank Limited	2014-2021
<b>80</b>	<b>Total Observation:</b>	

**3.3. Sample size**

Here, all the Commercial banks of Bangladesh have been identified as target population for research. This study has gathered data from 10 banks of Bangladesh listed with Dhaka Stock Exchange (DSE). It covers the period of eight years ranging from 2014 to 2021. The chosen sample size of the study is 80. This sample is considered as representative of all the banks in Bangladesh and the sample has been chosen using non-probability convenience sampling. The collected data will be analyzed using SPSS software by applying Correlation and Regression analysis. The table-1 shows the name of the sample banks along with study period & number of observations.

### **3.4. Model Specification**

The models implemented in this study is as follows as:

#### **Model-1:**

$$ROA_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 INF_{it} + \beta_3 RIR_{it} + \beta_4 TA_{it} + \beta_5 NPL_{it} + \beta_6 LTD_{it} + \beta_7 INVINC_{it} + \beta_8 CAR_{it} + \beta_9 LIQ_{it} + \epsilon_{it}$$

#### **Model-2:**

$$INTINC_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 INF_{it} + \beta_3 RIR_{it} + \beta_4 TA_{it} + \beta_5 NPL_{it} + \beta_6 LTD_{it} + \beta_7 INVINC_{it} + \beta_8 CAR_{it} + \beta_9 LIQ_{it} + \epsilon_{it}$$

Where,

ROA<sub>it</sub> = Return on assets of ith bank for the time period t

INTINC<sub>it</sub> = natural logarithm of Interest Income of ith bank for the time period t

LTD<sub>it</sub> = Loan to Deposit ratio of ith bank for the time period t

CAR<sub>it</sub> = Capital adequacy ratio of ith bank for the time period t

LIQ<sub>it</sub> = Liquidity ratio of ith bank for the time period t

NPL<sub>it</sub> = natural logarithm of non-performing loans of ith bank for the time period t

TA<sub>it</sub> = natural logarithm of Total Assets of ith bank for the time period t

INVINC<sub>it</sub> = natural logarithm of Investment Income of ith bank for the time period t

GDP<sub>it</sub> = Gross Domestic Product for time period t

INF<sub>it</sub> = Inflation Rate for time period t

RIR<sub>it</sub> = Real Interest Rate for the time period t

i (no. of banks) = 1, 2, ..., 10

t (no. of years) = 1, 2, ..., 8

β<sub>0</sub> = the intercept (constant)

β<sub>1</sub>, β<sub>2</sub>, β<sub>3</sub>, β<sub>4</sub>, β<sub>5</sub>, β<sub>6</sub>, β<sub>7</sub>, β<sub>8</sub>, β<sub>9</sub> = The slope which denotes the extent to which bank profitability changes as the independent variable changes by one unit variable.

ε<sub>it</sub> = error if any

### **3.5. Hypothesis of the study**

H01 = Corporate Characteristics and Macroeconomic factors has no significant impact on ROA in Bangladesh Banking sector

HA1 = Corporate Characteristics and Macroeconomic factors has significant impact on ROA in Bangladesh Banking sector

H02 = Corporate Characteristics and Macroeconomic factors has no significant impact on Interest Income in Bangladesh Banking sector

HA2 = Corporate Characteristics and Macroeconomic factors has significant impact on Interest Income in Bangladesh Banking sector

## **4. Findings and Analysis**

This chapter shows the results & findings of the study grounded on the research objective of this study. Descriptive, Correlation & Regression analysis is used for investigating the data.

### **4.1. Descriptive Statistics**

In the study, the descriptive data of the variables are shown in Table -2. Table 2 shows that the sample banks recorded a minimum Return on Assets (ROA) of 0.0100 percent and a maximum of 3.1900 percent during the study period. Similarly, the Interest Income for these banks ranged from a minimum of 9.67 percent to a maximum of 10.33 percent. The average ROA and Interest Income were 1.294875 percent and 10.1179 percent, respectively. Among the Macroeconomic Variables, Inflation as measured by CPI has the highest Standard Deviation (i.e. 1.7860761) along with an average of 7.201125. Moreover, among the Corporate Characteristics, Loan to Deposit ratio has the highest Standard Deviation with an average of 84.007625.



**Table-2:** Descriptive Analysis

Variables	N	Range	Minimum	Maximum	Mean	Std. Deviation
Return On Assets	80	3.1800	.0100	3.1900	1.294875	.6444073
Interest Income	80	.66	9.67	10.33	10.1179	.12768
Gross Domestic Product	80	1.7100	5.5700	7.2800	6.445000	.5347897
Inflation As Per CPI	80	5.9020	5.4310	11.3330	7.201125	1.7860761
Real Interest Rate	80	5.9200	3.0700	8.9900	5.381250	1.7754902
Total Assets	80	.7238	10.8424	11.5662	11.225047	.1745996
Non-Performing Loans	80	1.2500	9.0678	10.3178	9.694092	.2780360
Loan To Deposit Ratio	80	37.8400	72.1300	109.9700	84.007625	6.8454063
Investment Income	80	.86	8.91	9.78	9.3872	.18003
Capital Adequacy Ratio	80	6.9900	8.1100	15.1000	11.934875	1.4616654
Liquidity	80	22.0300	57.3600	79.3900	67.340125	4.5526688
Valid N (list wise)	80					

#### 4.2. Correlation Analysis

The Pearson's correlation coefficients among study variables are shown in Table 3.

**Table-3:** Correlation matrix for the dependent and independent variables

	ROA	INTINC	GDP	INF	RIR	TA	NPL	LTD	INVINC	CAR	LIQ
ROA	1										
INTINC	1**	1									
GDP	-.478**	.532**	1								
INF	.465**	-.518**	.444**	1							
RIR	-.073	.050	.640**	.222*	1						
TA	-.620**	.859**	.707**	-.608**	-.255*	1					
NPL	-.738**	.763**	.622**	-.670**	-.124	.821**	1				
LTD	.283*	-.244**	.061	.083	.340**	-.106	.303**	1			
INVINC	-.324**	.549**	.300**	-.456**	-.014	.606**	.615**	.020	1		
CAR	-.205	.174**	.438**	-.297**	-.144	.463**	.425**	-.018	.235*	1	
LIQ	.245*	-.301**	.120	.032	.429**	-.140	-.171	.633**	-.057	-.132	1

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

Table 3 of the correlation study indicates a positive relationship between ROA and the following variables: liquidity (LIQ), loan to deposit ratio (LTD), and inflation (INF). This suggests that the ROA increases with increases in inflation, loan to deposit, and liquidity ratio. As a result, ROA positively correlates with liquidity ratio, loan to deposit, and inflation. Inflation and ROA have the most positive association. On the other hand, ROA has a negative correlation with the following: capital adequacy ratio (CAR), non-performing loans (NPL), investment income (INVINC), real interest rate (RIR), total assets (TA), and GDP. This indicates that, like the GDP, Real Interest Rate, Total Assets, Non-Performing Loans, Investment Income, and Capital Adequacy Ratio, the ROA tends to move in the opposite way. The ROA negative association with non-performing loans is the strongest. Additionally, the table above shows a positive relationship between Interest Income and the following variables: Real Interest Rate (RIR), Total Assets (TA), Non-performing Loans (NPL), Investment Income (INVINC), Gross Domestic Product (GDP), and Capital Adequacy Ratio (CAR). Interest Income has the strongest positive association with total assets. Conversely, interest income has a negative relationship with liquidity (LIQ), the loan to deposit ratio (LTD), and inflation (INF). Interest income and inflation have the most negative association.

#### 4.3. Regression Analysis

The regression of bank characteristics and macroeconomic variables on bank profitability has been analysed by describing bank profitability in terms of Return on Assets (ROA) and Interest Income. In the regression analysis, the following outcomes are drawn by using enter method.

**4.3.1. Regression Analysis of Corporate characteristics and macroeconomic variables on the ROA is shown in the following tables:**

When Return on Assets (ROA) is the dependent variable, the model summary in Table 4.1 indicates that the Coefficient of Correlation (R) is 82.5%, with an R-squared value of 68%. Additionally, the adjusted R-squared is 63.9%, suggesting that 63.9% of the variance in profitability can be explained by the independent variables.

**Table 4.1: Model Summary when ROA is Dependent Variable**

<b>Model-1 Summary-</b>				
<b>Model</b>	<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
1	.825 <sup>a</sup>	.680	.639	.3871469
a. Predictors: (Constant), Liquidity, Inflation As Per CPI, Capital Adequacy Ratio, Investment Income, Real Interest Rate, Loan To Deposit Ratio, Gross Domestic Product, Total Assets, Non-Performing Loans b. Dependent Variable- ROA				

**Table-4.2: ANOVA table when ROA is Dependent Variable**

<b>ANOVA<sup>b</sup></b>						
<b>Model</b>		<b>Sum Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
1	<b>Regression</b>	22.314	9	2.479	16.542	.000 <sup>a</sup>
	<b>Residual</b>	10.492	70	.150		
	<b>Total</b>	32.806	79			
a. Predictors: (Constant), Liquidity, Inflation As Per CPI, Capital Adequacy Ratio, Investment Income, Real Interest Rate, Loan To Deposit Ratio, Gross Domestic Product, Total Assets, Non-Performing Loans b. Dependent Variable: Return On Assets						

The ANOVA table (Table 4.2) indicates that the F-value is 16.542, which is significant at the 5% significance level. This demonstrates that the combined predictors can significantly forecast profitability (ROA) with a p-value less than 0.05.

**Table-4.3: Coefficients table when ROA is Dependent Variable**

<b>Coefficients<sup>a</sup></b>					
	<b>Unstandardized Coefficients</b>		<b>Standardized Coefficients (Beta)</b>	<b>t</b>	<b>Sig.</b>
	<b>B</b>	<b>Std. Error</b>			
<b>Constant</b>	15.339	4.638		3.307	.001
<b>Gross Domestic Product</b>	-.454	.172	-.377	-2.642	.010
<b>Inflation As Per CPI</b>	.012	.034	.032	.338	.736
<b>Real Interest Rate</b>	-.145	.040	-.400	-3.664	.000
<b>Total Assets</b>	-.355	.538	-.096	-.660	.511
<b>Non-Performing Loans</b>	-1.687	.374	-.728	-4.510	.000
<b>Loan To Deposit Ratio</b>	-.013	.010	-.134	-1.316	.192
<b>Investment Income</b>	.938	.346	.262	2.712	.008
<b>Capital Adequacy Ratio</b>	.096	.035	.217	2.722	.008
<b>Liquidity</b>	.015	.014	.109	1.120	.267

The real interest rate, gross domestic product, and non-performing loans are all significant at the 5% significance level, while the capital adequacy ratio and investment income are significant at the 10% significance level, as shown in table 4.3 above. ROA is significantly and negatively impacted by GDP; research by Noman et al. (2015), Saeed (2014), Yakubu (2016), and Francis

(2013) also demonstrate this relationship. The reasons for this inverse relationship might include the customer's inclination to hold onto their excess money and take out loans, as well as their informational asymmetry and lack of knowledge about changes in a nation's economy. Furthermore, when the GDP grows, bank rivalry rises, potentially leading to lower profits. Combey and Togbenou (2017) have likewise proven that inflation has little effect on ROA. For banks, inflation has little to no effect. This is due to the fact that as profits rise, interest rates rise in tandem, raising the expense of running the banking industry. Real Interest Rate significantly and negatively affects ROA; this finding is in line with Simiyu and Ngile's (2015) research. When interest rates are low, banks might earn by making other investments instead of lending money.. Then the bank can get the cash back to give loan again. Total Assets has no impact on ROA. Non-Performing Loans has a significant and negative relation with ROA this result is consistent with the study of Abdullah, Parvez, and Ayreen (2014), Noman, Chowdhury, Chowdhury, Kabir and Pervin (2015). This is because if a bank lends in an uncontrollable way to its customer without any proper assessment of risk, the customer maybe unable to pay back the loans this will result in low banks profitability. Loan to Deposit ratio has no impact on ROA. Investment Income has a significant and positive relation with ROA. Capital Adequacy Ratio also has a significant and positive relation with ROA this result is consistent with the study of Bennaceur and Goaid (2008), Ongore and Kus (2013), Yakubu (2016), Pradhan and Shrestha (2016), Omar & Kamil (2017), Abobakr (2018). Qin and Dickson (2012) also show that CAR has positive impact on profitability if fixed interest expenses can be avoided. A bank's profitability will eventually be positively impacted by having a greater capital adequacy ratio since it can support further asset expansion and, in addition, because the increased capital can be used to minimise any risks that may occur. The less the company needs to rely on external financing, the greater the capital adequacy ratio. The conclusion that liquidity has no effect on ROA is corroborated by Vieira (2010) and Masood and Ashraf (2012).

**4.3.2. Regression Analysis of Corporate characteristics and macroeconomic variables on the Interest Income is shown on the following tables:**

**Table-4.4:** Model Summary when Interest Income is Dependent Variable

Model-2 Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.912 <sup>a</sup>	.831	.809	.05574
a. Predictors: (Constant), Liquidity, Inflation As Per CPI, Capital Adequacy Ratio, Investment Income, Real Interest Rate, Loan To Deposit Ratio, Gross Domestic Product, Total Assets, Non-Performing Loans				
b. Dependent Variable- Interest Income				

When Interest Income is Dependent variable the above Model summary in table 4.4 displays that, using all the predictors concurrently the Coefficient of Correlation (R) is 91.2% and R square is 83.1%. The table also shows that adjusted R Square is 80.9%, which means that 80.9% of the variance in profitability can be estimated by the Independent variables.

**Table-4.5:** ANOVA table when Interest Income is Dependent Variable

ANOVA <sup>b</sup>						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.071	9	.119	38.290	.000 <sup>a</sup>
	Residual	.217	70	.003		
	Total	1.288	79			
a. Predictors: (Constant), Liquidity, Inflation As Per CPI, Capital Adequacy Ratio, Investment Income, Real Interest Rate, Loan To Deposit Ratio, Gross Domestic Product, Total Assets, Non-Performing Loans						
B. Dependent Variable: Interest Income						

The above ANOVA table 4.5 displays that the value of F is 38.290 and is significant at 5% significance level. This shows that the union of the predictors can significantly ( $P < 0.05$ ) forecast the profitability (Interest Income).

**Table-4.6:** Coefficients table when Interest Income is Dependent Variable

Coefficients <sup>a</sup>					
	Unstandardized Coefficients		Standardized Coefficients (Beta)	t	Sig.
	B	Std. Error			
<b>Constant</b>	3.405	.668		5.100	.000
<b>Gross Domestic Product</b>	.047	.025	.196	1.887	.063
<b>Inflation As Per CPI</b>	-.001	.005	-.020	-.292	.771
<b>Real Interest Rate</b>	.025	.006	.352	4.433	.000
<b>Total Assets</b>	.556	.077	.760	7.185	.000
<b>Non-Performing Loans</b>	.015	.054	.032	.277	.783
<b>Loan To Deposit Ratio</b>	.000	.001	-.010	-.129	.898
<b>Investment Income</b>	.002	.050	.002	.034	.973
<b>Capital Adequacy Ratio</b>	.000	.005	.002	.036	.972
<b>Liquidity</b>	-.002	.002	-.055	-.780	.438

The above table 4.6 displays that Real Interest Rate and Total Asset is significant at 5% significance level whereas, Gross Domestic Product is significant at 10% significance level. Gross Domestic Product has a significant and positive relation with Interest Income, Sufian and Chong (2008), Zeitun (2012), Saeed, M. S. (2014), Ebenezer, Omar & Kamil (2017) also found similar result in their study. If the economic growth increases, the profit of the bank also increases on the other hand downturn in the economic growth undesirably affects the interest income. so, the GDO is affecting the bank's profitability positively. Inflation has a negative insignificant impact on Interest Income, Tian and Keen (2007) also indicated same result. Real Interest Rate has a significant and positive relation on Interest Income. Currently the real interest rate is decreasing. This lowers the borrowing cost and inspires the businesspersons to invest more. However, if the borrower becomes unable to pay back the money, this will affect the bank's profitability negatively. Therefore, lower interest rate increases credit risk. On the other hand, lower interest will discourage the borrowers to keep their money in banks. Total Assets has a significant and positive relation with Interest Income this result is similar with the study of Alpera and Anbarb (2011), Yakubu (2016), Topak & Talu (2017), Combey and Togbenou (2017), Abobakr (2018). The total asset denotes the size of the bank. An increase in banks size increases the profitability of banks by allowing them to understand economics of scale (Bill Medley, 2016). An increase in asset level leads to decrease in the scale of economies. Non-Performing Loans, Loan to Deposit ratio, Investment Income, Capital Adequacy Ratio and Liquidity has no impact on Interest Income

#### 4.4. Overall Analysis

Based on the above analysis this study shows consistent results with the past studies.

##### Model-1:

In model-1, ROA is expected to have 63.9% descriptive power:

$$ROA_{it} = 15.339 - .454 GDP_{it} + .012 INF_{it} - .145 RIR_{it} - .355 TA_{it} - 1.687 NPL_{it} - .013 LTD_{it} + .938 INVINC_{it} + .096 CAR_{it} + .015 LIQ_{it} + \epsilon_{it}$$

##### Model-2:

In model-2, Interest Income is expected to have 80.9% descriptive power:

$$INTINC_{it} = 3.405 + .047 GDP_{it} - .001 INF_{it} + .025 RIR_{it} + .556 TA_{it} + .015 NPL_{it} + .000 LTD_{it} + .002 INVINC_{it} + .000 CAR_{it} - .002 LIQ_{it} + \epsilon_{it}$$

The results of the tested hypothesis are shown below in table-5.

**Table-5:** Overall results of the study

Hypothesis	Variables	Results	Significance level (5% & 10%)
H01	Corporate characteristics and macroeconomic variables have no Impact on ROA	Rejected	No
HA1	Corporate characteristics and macroeconomic variables have Impact on ROA	Accepted	Yes
H02	Corporate characteristics and macroeconomic variables have no Impact on Interest Income	Rejected	No
HA2	Corporate characteristics and macroeconomic variables have Impact on Interest Income	Accepted	Yes

**5. Conclusions**

This study has measured the effect corporate characteristics and macroeconomic factors affect the profitability of banking sector in Bangladesh. To accomplish our objective correlation and regression analysis is applied on the data of 10 banks of Bangladesh over a period of 8 years ranging from 2014-2021. The empirical outcomes indicate that sound capitalized banks have greater profits. The problem statements show that higher exposure to credit risk reduces banks profit. The findings suggest that Capital adequacy ratio and Bank size which denoted by Total assets has a significant and positive impact on banks profitability whereas non-performing loans has a significant and negative impact on banks' profitability. Moreover, Macroeconomic variables. Banks profitability can simply be achieved if managers in the bank and policy makers pay special attention to corporate characteristics as well as macroeconomic conditions that have effect on their profitability. This study indicates that there is a need for bank managers to make best use of resources and focus on wise risk management measures for sound & good services in order to get better returns. Beside this, the banks need to response quickly to the risk related to fluctuating macroeconomic factors. The outcomes of this study ensure the significance of corporate characteristics & macroeconomic factors on the bank profitability. Therefore, the governments need to initiate efficient regulatory frameworks to improve banking sector profitability.

**6. Scope for Further Research**

Even though this study will deliver some useful perceptions to the policymakers, stakeholders and the bank itself but still there is some restrictions. Firstly, this research is limited to only 10 banks in Bangladesh with 8 years data ranging from 2014-2021, so this small sample cannot describe the picture of overall banking sector. Secondly, we have considered on banking industry, if other non-bank industries were taken this would provide results that are more reliable. Thirdly, there are many factors that affect banks' profitability, but all factors are not considered. Moreover, in this study Interest Income and Return on Asset (ROA) has been identified for measuring financial performance. Except for these, items like Price-earnings ratio, Earnings per share (EPS) and Return on Equity (ROE) can also be used for such measurements, which is not considered. Lastly, there is a severe limitation for time and funding to conduct the research.

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