Profitability Determinants of Commercial Banks: in the Context of Bangladesh

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Abstract

This study investigates the effects of both the bank-specific and macroeconomic factors on the performance of Dhaka Stock Exchange (DSE) listed traditional commercial banks. To explore the association, the present study has analyzed the panel data collected from 23 listed traditional commercial banks during a period of eight years starting from 2009 to 2016. The results of the random effect-GLS method indicate that total loan to total asset (TLTA), equity to total assets (EQTA), loan to deposit (LTDEP), and interest margin (INTMARGIN) exert a positive effect on both the performance measures (ROA and ROE), while logarithm of total assets (LNASSET), and GDP growth rate (GDPGR) affect the banks' performance negatively. Moreover, the dummy variable representing the banks' size influence the performance of commercial banks positively, thereby supporting the better operating efficiency of large commercial banks. The research would cater to the needs of different stakeholders such as top managements, regulatory authority, and investors, providing the knowledge of the factors related to banks' profitability.

Keywords: Bank Performance, Profitability, Commercial Banks, Bangladesh

1. Introduction

Commercial banks play a critical role in the economy of any country by getting the surplus funds of saving units to deficit units in an efficient way. Thus the economic activities would get momentum from the sound operation of banking sector in an economy. In the context of Bangladesh, financial sector is bank centric as all the commercial banks collectively hold 95% of the sector's total assets. Therefore, the overall condition of the financial sector in Bangladesh solely depends on the performance of banking sector.

The sound operation of banking industry would contribute to the economic growth of a country, whereas the poor performance may lead to the economic crisis. Commercial banks help facilitate the financial transactions, which consequently save an economy from a stagnant condition. Like any other business entity, a commercial bank needs to generate adequate amount of after tax income through meeting up all fund collecting and operating expenses. Therefore, well performance of banking industry is not only essential for the betterment of the entire economy but also important for the sustainability of individual bank.

As commercial banks play a dominating role in the financial sector of Bangladesh, a potential investor would get attracted in investing in shares of banks rather than other financial institutions. That is why performance of a commercial bank is examined by the prospective investors before putting money in its shares. A bank might enhance the value of its shares by demonstrating well performance throughout the years. When the potential investors get to know the performance of a commercial bank, they can take their investment decisions easily. Likewise, by getting the performance of commercial banks, potential depositors can make their decisions in which bank they should put their money.

A well performing commercial bank may collect deposits at a lower cost as the depositors get the bank safer than other banks operating in the same industry. Lower fund cost would enhance the efficiency of the specific commercial bank and subsequently would provide a competitive edge. The bank getting deposits at lower cost would generate more income compared to other banks due to its larger spread.

The performance of commercial banks might be associated with different bank specific as well as various macroeconomic factors. Samad (2015) identified a few bank specific factors such as loan-deposit ratio, loan-loss provision to total assets, equity capital to total assets, and operating expenses to total assets and the researcher finds that they significantly impact the performance of commercial banks. In a very recent study, Mahmud et al. (2015) incorporated several bank specific factors in determining the profitability of commercial banks in Bangladesh. The study indicated that capital adequacy ratio, bank size, and total debt to total equity have significant impact on bank performance. Sufian and Habibullah (2009) conducted a research in search for the relevant factors explaining the profitability of commercial banks. According to the research, bank specific factors such as loans intensity ratio, credit risk, and cost has positive association with banks' profitability, while non-interest income demonstrates a negative association. Most of the previous research works conducted on

profitability determinants of commercial banks in the context of Bangladesh included only the bank-specific factors, whereas very few researches incorporated macroeconomic indicators in explaining profitability. That is why this present study would fill up the research gap by including both the bank-specific and macroeconomic factors in determining profitability. Moreover, the research adds value to the existing literature in the context of Bangladeshi banking sector by demonstrating the size effect of commercial banks in determining their profitability. The remaining part of the research has been divided into the following sections. Chapter 2 deals with the financial system of Bangladesh followed by chapter 3 presenting literature review. Rationale of the study and variables constructions have been illustrated in section 4 and section 5 respectively. Hypothesis development and methodology have been presented in section 6 and section 7 respectively. The last two sections such as empirical results and discussion, and conclusion have been demonstrated in section 8 and section 9 respectively.

2. Financial System of Bangladesh

The financial system of Bangladesh consists of three broad sectors such as formal sector, semi-formal sector, and informal sector. All the scheduled and non-scheduled banks (Note1), non-bank financial institutions, microfinance institutions, insurance companies, co-operative societies, asset management companies, merchant banks, brokerage houses, stock exchanges, and credit rating companies are the part of formal sector. Semi-formal sector includes House Building Finance Corporation (HBFC), Palli Karma Sahayak Foundation (PKSF), and Samabay Bank. Finally, informal sector incorporates shadow banking activities.

Basically, the financial system in Bangladesh is mainly composed of two types of institutions: non-bank financial institutions (NBFIs) and banks. However, the banking sector alone accounted for around 95 per cent of the sector's total assets as of the end of December 2011 (Ahamed, 2012). Therefore, this represents that the financial system of Bangladesh is predominantly bank centric and the country's economic growth primarily rests on the development of its credible and stable banking system.

2.1 Asset Structure of Banking Sector

Table 1 shows the total assets of Bangladesh banks, it is obvious that private commercial banks (PCBs) holds the major portion of total asset of the banking sector of Bangladesh followed by state-owned commercial banks (SCBs), and foreign commercial banks (FCBs) respectively. Specialized development banks (SBs) hold the least amount of banking sector's assets of Bangladesh. The size of the banking sector of Bangladesh has increased in the recent years because total assets of the sector are showing an increasing trend.

It is obvious that the total asset of the banking sector of Bangladesh is increasing from year to year. All banks are opening new branches and covering new customers every year, and this is increasing the asset size of the banking industry. Moreover, the government of Bangladesh has taken financial inclusion program to bring the people living in distant places under the umbrella of banking system. Therefore, the existing banks are directed by the central bank to open rural branches to implement the financial inclusion program of the government.

Table 1. Total Asset by Type of Banks (unit: billion BDT)

Bank Types	2010	2011	2012	2013	2014	2015
SCBs	1384.3	1629.2	1831.9	2108.5	2517.1	2839.6
SBs	295.4	328.8	385.5	454.8	333.8	291.3
PCBs	2854.6	3524.2	4371.5	4948.2	5787.1	6652.9
FCBs	320.8	385.4	441.8	488.7	505	530.8
Total	4855.1	5867.6	7030.7	8,000.20	9,143	10,314.70

Source: Financial Stability Report, 2015

Table 2. Bank Asset Structure (unit: billion BDT)

	2010	2011	2012	2013	2014	2015
Cash in Hand	52	59.7	81.1	102.70	91.10	92.3
Balance with other Banks	491.1	683.5	762.3	873.7	1036.7	1144.8
Total Investment	589.3	793	1,113.4	1,571.2	1,833.1	2,074.4
Total Loans	3198.6	3,792.5	4,386.7	4,720.1	5,392.9	6,191.1
Fixed Assets	101.7	140.7	162.1	198.2	216.6	224.4
Other Assets	421.3	397	488.1	532.5	570.7	584.4
Non-banking Assets	1.1	1.2	36.9	1.8	1.9	3.3
Total Assets	4855.1	5867.6	7,030.6	8,000.2	9,143	10,314.7

Source: Financial Stability Report, 2015

According to Table 2, it is found that loans and investment consist of the major portion of the total assets of banking sector. It is also noticed that banking sector holds a very small portion of its total assets as cash in hand. Holding a considerable amount of cash does not provide any return with the commercial banks. However, banks are legally bound to hold a sufficient amount of cash to meet liquidity crisis that might arise from excessive withdrawal pressure by banks' customers.

2.2 Liability Structures of Banking Sector
According to Table 3, it can be found that deposit is the main component of banking sector liabilities. we get that banking sector had been maintaining above 80% deposit of liabilities from the year 2010 to 2015. The higher percentage of deposits indicate that banks' main source of fund collection is deposit.

Table 3. Compositions of Bank Liability (unit: billion BDT, %)

	2010	2011	2012	2013	2014	2015
Borrowing from other Banks	159.8 (3.60)	226.3 (4.23)	316.0 (4.90)	221.6 (3.03)	313.0 (3.73)	398.7 (4.21)
Total Deposit	3721.8 (83.90)	4,509.8 (84.33)	5,422.2 (84.00)	6,294.3 (85.96)	7,140.6 (84.99)	8,032.0 (84.82)
Bills Payable	59.8 (1.35)	65.3 (1.22)	76.0 (1.18)	68.9 (0.94)	87.8 (1.05)	87.6 (0.93)
Other Liabilities	494.8 (11.15)	546.4 (10.22)	640.6 (9.92)	737.2 (10.07)	860.2 (10.24)	951.7 (10.05)
Total Liabilities	4436.2	5,347.8	6,454.8	7,322.0	8,401.6	9,470.0

Source: Financial Stability Report, 2015

Banks are financial intermediaries which collect deposits from the saving units and transfer those funds to the deficit units. Therefore, to increase its asset size, banking sector needs to increase its deposit collection. The following figure shows the deposit collection of the banking sector by types of Banks from the year 2010 to 2015(refer to Table 4).

Table 4. Deposits of Banking Sector by Types of Banks (unit: billion BDT)

Bank Types	2010	2011	2012	2013	2014	2015
SCBs	1044.9	1235.6	1377.9	1631.2	2125.5	2298.6
SBs	183.4	214.4	260.4	364.2	239.6	262.6
PCBs	2266.5	2787.5	3430.7	3939.3	4449.4	5132
FCBs	227.1	272.2	353.2	359.5	326	338.8
Total	3721.9	4509.7	5422.2	6294.2	7140.5	8032

Source: Financial Stability Report, 2015

2.3 Risk-weighted Capital Scenario of Banking Sector
Capital adequacy ratio refers to the amount of equity and other reserves which a bank holds against its risky

assets. The purpose of this reserve is to protect the depositors from any adverse and unpredicted loss. Two types of capital are commonly used as a measure of capital namely tier one capital which can absorb losses without a bank being required to cease trading, and tier two capital, which can absorb losses in the event of a winding-up and so provides a degree of protection to depositors (Basel Committee on Banking Supervision,1988).

Table 5. Capital Adequacy Ratio of Different Types of Banks (unit: %)

Bank types	Yr-2010	Yr-2011	Yr-2012	Yr-2013	Yr-2014	Yr-2015
SCBs	8.9	11.7	8.1	10.8	8.3	6.4
SBs	-7.3	-4.5	-7.8	-9.7	-17.3	-32
PCBs	10.1	11.5	11.4	12.6	12.5	12.4
FCBs	15.6	21	20.6	20.2	22.6	25.6
Banking Sector	9.3	11.4	10.5	11.5	11.3	10.8

Source: Bangladesh Bank Annual Report, 2016

According to Table 5, we get that Capital adequacy Ratio (CAR) has shown an increasing trend over the periods 2010 to 2015. In the year 2010, CAR was the lowest which was 9.3%. The ratio increased in the year 2011 and reached to 11.4% and again decreased to 10.5%. The ratio got its highest percentage in the year 2013 which was 11.5%.

2.4 Non-performing Loan Ratios of Banking Sector in Bangladesh
Non-performing loan ratio measures the proportion of classified loans against the total loans and advances for a period. It gives an insight to the management regarding the default conditions of loans and advances for a given period. NPL is considered as the best measure of credit risk for a bank according to many researchers

Table 6. NPL Ratios by Type of Banks (unit: %)

Bank types	2010	2011	2012	2013	2014	2015
SCBs	15.7	11.3	23.9	19.8	22.2	21.5
SBs	24.2	24.6	26.8	26.8	32.8	23.2
PCBs	3.2	2.9	4.6	4.5	4.9	4.9
FCBs	3	3	3.5	5.5	7.3	7.8
Bank Sector	7.3	6.1	10	8.9	10	8.8

Source: Financial Stability Report, 2015

Table 6 shows the NPL ratio of Banking sectors. We get that Specialized Banks (SBs) has the highest percentage of non-performing loans compared to its total loan portfolio followed by State-owned Commercial Banks (SCBs) and Private Commercial Banks (PCBs).

2.5 Profitability of the Banking Sector of Bangladesh
ROA is the net profits expressed as a percentage of total assets. It represents profit earned per unit of assets and indicates the efficiency of the asset management. ROA is commonly used as an indicator of competence and operational efficiency of banks since it addresses the profit earned from the assets employed by the bank. ROA is an important performance measure as it is directly related to the profitability of banks. Furthermore, ROA is not affected by high equity multipliers and ROA represents a better measure of the ability of the firm to generate returns on its portfolio of assets. The present study measures ROA as the ratio of after tax income to average total assets of two consecutive years of a bank. From the Table 10, we find that overall ROA is decreasing with a little fluctuation in the year 2013. The banking sector had the lowest ROA in the year 2012 and 2014 whereas it had the highest ROA in the year 2010. we see some important insights about the Return on Asset (ROA) of different commercial banks in different time periods. In the year 2012, State-owned Commercial Banks (SCBs) earned a negative ROA which was -0.6%. In addition, Development Financial Institutions (DFIs) earned a negative Return on Asset (ROA) in the year 2013 which was -0.4%. In the year 2014, both the SCBs and DFIs were unable to achieve any positive ROA which were -0.6% and -0.7% respectively. These two categories of banks generated a negative ROA in the year 2015 as well. The negative ROA means that the banks could not earn any profit for their investors and it gives a very bad signal about the operations of those banks.

Table 7. Return on Assets by types of Banks (unit: %)

	2010	2011	2012	2013	2014	2015
SCBs	1.1	1.3	-0.6	0.6	-0.6	-0.04
SBs	0.2	0.1	0.1	-0.4	-0.7	-1.2
PCBs	2.1	1.6	0.9	1	1	1
FCBs	2.9	3.2	3.3	3	3.4	2.9
Bank Sector	1.8	1.5	0.6	0.9	0.6	0.8

Source: Financial Stability Report, 2015

3. Literature Review

Sufian and Habibullah (2009) investigated the profitability of Bangladeshi commercial banks by collecting data from 37 commercial banks for the period of eight years spanning from 1997 to 2004. The study indicates that bank specific characteristics such as loan intensity, credit risk, and cost impact banks' profitability negatively. However, the same study reported a negative relationship between non-interest income and banks' profitability. The research also suggests that bank size does not have uniform effect across different profitability indicators such as return on average assets (ROAA), return on average equity (ROAE), and net interest margin (NIM).

To identify the bank-specific, macroeconomic, and financial market related factors associated with the profitability of commercial banks, Kosmidou et al., (2005) conducted a research on panel data collected from 32 commercial banks from the year 1995 to 2002. The researchers included return on assets (ROAA) and net interest margin (NIM) as the dependent variables, while cost to income ratio (COST), the ratio of liquid assets to short term funding (LIQUID), the ratio of loan loss reserves to gross loans (LOSRES), the ratio of equity to total assets (EQAS), and logarithm of total assets (SIZE) were considered as the independent variables. The study reveals that the ratio of equity to total assets (EQAS) exerts a positive impact on banks' profitability.

Another study performed by Ben Naceur and Omran (2008) finds that credit risk and bank capital are among the bank specific characteristics that have positive and significant impact on bank profitability. However, macroeconomic variables demonstrated no influence on banks' profitability. Camilleri (2005) analyzed the banking industry of Malta and found that bank size had a positive impact on profitability.

Khawish (2011) conducted a study on Jordanian commercial banks from the period 2000-2010 and reported that size, leverage, capital adequacy ratio, net interest margin, and expense management efficiency have positive relatuionship with profitability, while inflation has a negative impact on profitability. In a recent study performed by Obamuyi (2013) indicated that bank capital, size, and interst income all have positive influence on banks' profitability. Islam (2010) also found the positive relationship between size and profitability in the context of Bangladeshi commercial banks.

Ahmad and Ariff (2007) made a comparative analysis between commercial banks of emerging and developed economies. The researchers found that loan-loss provision to total loans, and loan to deposit ratio have significant association with banks' credit risk.

In a research conducted by Kolapo et al., (2012) on the effect of credit risk on bank performance in Nigeria, the researchers collected panel data from five commercial banks. After analyzing the data, the researcher found that non-performing loan to loan and advances (NPL/LA) impacts the bank profitability inversely. Moreover, the study indicated that loan-loss provisions to total loans (LLP/TL) also influence the profitability negatively. The study points out an mesningful findings that loan and advances to total deposits (LA/TD) influence the profitability positively. It means that, in the context of Nigeria, the banks extending more amount of loans are doing better in terms of profitability compared to the banks conservative in extending loans. In the perspective of this research, commercial banks should approve the loan applications if they seem to meet the minimum credit standards of the lending bank.

In another study done in the context of Nigeria, Kurawa and Garba (2014) collected a panel data from sixteen listed commercial banks of the country and included the variables such as default rate (DR), cost per loan asset (CLA), and capital adequacy ratio (CAR) and the dependent variable return on assets (ROA). The study employed random effect GLS as the econometric model to evaluate the associations of the explanatory variables with the dependent variable (ROA). The study reported that all the included variables have a positive impact on the dependent variable ROA. It suggested that if the commercial banks maintain a good amount of capital, then they can enjoy a better profitability compared to the banks which do not maintain the sufficient amount of regulatory capital.

Alshatti (2015) conducted a similar type of study on Jordanian commercial banks to explore the factors that can explain banks' performance. The researcher selected a variable named non-performing loans to gross loans (NPL/GL) as a measure of credit risk. After analyzing the collected data, the researcher found that the explanatory variable named non-performing loans to gross loans had a positive impact of banks' performance. This finding is very interesting as we usually predict if the ratio non-performing to gross loans (NPL/GL) increases the profitability is expected to fall as well. But the findings of the study make us focus that only the non-performing loans are not the only factor to explain profitability. There might be another factor which might influence the profitability of Jordanian commercial banks.

Poudel (2012) completed a research on Nepalese commercial banks to find out any relevant factors that can explain the profitability of commercial banks. In this pursuit, the researcher included default rate (DR), capital adequacy ratios (CAR), and cost per loan asset (CLA). The researcher also incorporated return on assets (ROA) as the performance indicator of commercial banks. Upon analyzing the data, the researcher concluded that default rate (DR) and capital adequacy ratio (CAR) have negative association with ROA. In addition, the variable named cost per loan asset (CLA) also has an inverse relationship with banks' profitability measured by return on assets (ROA).

To identify the relevant factors of problem loans in Spanish commercial banks, Salas and Saurina (2002) conducted a study during the periods 1985-1997 incorporating some macroeconomic and bank specific variables. The study indicated that capital adequacy ratio has a significant inverse relationship with problem loans, which concluded that the banks keeping sufficient amount of capital were likely to have less amount of classified loans. On the other hands, the commercial banks which are reluctant to maintain sufficient capital have the possibility to burden with a large amount of classified loans. The study supports the banks having a significant amount of equity capital that can absorb any loss from loan defaults.

Kosmidou et al., (2008) examined the factors that can explain the profitability of commercial banks in the context of United Kingdom (UK). In their extensive study, the researchers collected a panel data from 32 commercial banks over the period 1995-2002. The researchers reported that capital strength measured by equity to asset ratio is the key determinant of the profitability of commercial banks. The study further indicated that the banks which have capital strength are likely to attract the depositors to deposit their money at lower interest rate as they find the banks safer than the banks having less amount of capital. Consequently, the commercial banks having sufficient amount of capital might collect their funds at lower cost compared to the banks which have less capital strength.

Abbas et al., (2014) investigated the impact of credit risk on the performance of banking system of Pakistan from the periods 2006-2011. The study reveals that credit risk measured by ratio of nonperforming loans to total loan and loan loss provision to non-performing loan negatively affect the performance of banks. Adeusi et al., (2013) examined risk management practices and bank financial performance in Nigeria. The research finds a positive relationship between capital asset ratio and bank performance whereas the relationship is inverse between bank performance and bad loans. To the best of my knowledge, most of the studies conducted on the profitability determinants of commercial banks in Bangladesh include only the bank specific factors. Macroeconomic factors such as GDP growth and Consumer Price Index (CPI) have been rarely included in the similar type of studies in the context of Bangladesh. This study tries to include both the bank specific as well as macroeconomic factors in explaining the performance of commercial banks in Bangladesh. The current research would fill up the research gap by identifying the macroeconomic factors relevant to the performance of commercial banks.

4. Data and Methodology
4.1 Methodology

The study considers a panel data collected from 23 listed commercial banks over the periods 2009 to 2016. Although there are 30 listed commercial banks, the research excludes seven Islamic banks due to their differences in banking system compared to traditional commercial banks. In the context of Islamic banks, receiving interest from extending loans is not permissible. Islamic banks invest their money in different businesses instead. The present research did not include Islamic banks as they conduct their business in a different way than conventional banks.

The random effect model assumes that intercept for each cross-sectional unit would be derived from a common intercept α and a random variable u_i which varies cross-sectionally. However, u_i has zero mean and is independent of explanatory variables (x_{it}).

The general form of the linear model that would be estimated by the research is:

$$\pi_{it} = \beta_0 + \beta_{jt} X_{jt} + \varepsilon_{jt} \qquad (1)$$

Here, π_{it}= the performance of ith commercial bank at the tth year. β_j= a set of unknown parameters, X_j= a set of bank-specific and macroeconomic variables discussed above, ϵ_{it}= random error tern distributed normally. In addition, the random effect process uses GLS (Generalized Least Square) method to estimate the parameter. The following is the brief discussion of both the dependent and independent variables included in the study.

4.2 Data Description

Dependent Variable

The present study has incorporated return on assets (ROA) and return on equity (ROE) as the dependent variable.

Return on Asset (ROA)

ROA is the net profits expressed as a percentage of total assets. It represents profit earned per unit of assets and indicates the efficiency of the asset management. ROA is commonly used as an indicator of competence and operational efficiency of banks since it addresses the profit earned from the assets employed by the bank (Jahan, 2012).

ROA is an important performance measure as it is directly related to the profitability of banks (Kosmidou, 2008; Sufian & Habibullah, 2009). Furthermore, ROA is not affected by high equity multipliers and ROA represents a better measure of the ability of the firm to generate returns on its portfolio of assets (Rivard & Thomas, 1997). The present study measures ROA as the ratio of after tax income to average total assets of two consecutive years of a bank.

Return on Equity (ROE)

Another widely used measure of profitability is ROE which is the ratio referring how much profit a company generates compared to the total amount of shareholders' equity found in the balance sheet (Ongore & Kusa, 2013). ROE reflects the efficiency of a bank to manage its shareholders' equity. Therefore, the present research considers it alongside ROA as a performance measure of Bangladeshi commercial banks. The researcher measures ROE as the ratio of after tax income to average shareholders' equity of two consecutive years of a bank.

Independent Variables

This study has included both firm-specific as well as macroeconomic factors as the determinant of commercial banks' profitability. The bank-specific variables are TLTA (total loans/total assets), LLPTL (loan loss provisions/total loans), EQTA (bank equity/total assets), LTDEP (Loans/ Deposits), OPEXTA (operating expense/total assets), CAR (capital adequacy ratio), LNASSET (Logarithm of Assets) INTMARGIN (Interest Margin), Dummy representing the size effect. However, the macroeconomic variables are GDPGR (GDP growth rate), and CPI (consumer price index). A brief discussion of all the independent variables are as follows.

TLTA: The ratio has been expressed by total loans as a percentage of total assets. Commercial banks earn the major portion of their income from extending loans to business organizations and to individual persons. A banks profitability would be related to its ability to extending loans to a larger number of customers. The larger loan portfolio of a commercial bank might be associated with its higher profitability than the bank with comparatively lower amount of loan portfolio. However, if the extended loans do not bring the interest income properly, then the larger size of the loan portfolio might not result in higher profitability. Therefore, the prior expectation is $\partial\pi/\delta TLTA$ > or < 0

LLPTL: The ratio is denoted by loan loss provision as a percentage of total loans. The management of commercial banks keep a portion of each year's operating income separate as the provision for bad loans. A certain percentage of existing loans is classified as commercial banks do not get any interest according to the loan contract. To maintain the lending capacity of commercial banks and to absorb the classified loans, commercial banks do this loan loss provisioning each year. Therefore, it can be predicted that $\delta\pi/\delta LLPTL < 0$

EQTA: The variable is demonstrated as bank equity as a percentage of total assets. The regulatory authority of commercial banks make them confined to hold a minimum percentage equity capital of total assets. If a specific bank does not maintain the minimum percentage of equity capital, then the bank is given warnings. Sufficient amount of equity helps a bank to absorb any loss that might arise from extending bad quality loans or any other day to day business activities. Commercial banks usually invest a significant amount of money in stocks of

different companies. However, the share prices might fall sharply and the specific bank investing its money on that shares loses a significant amount of money. The bank having a sufficient amount of equity capital would be capable of compensating the loss arising from these types of activities. Given the aforementioned discussion, the current study can arguably expect that $\partial\pi/\delta EQTA > 0$

LTDEP: The ratio is referred to loans as a percentage of deposits. Commercial banks earn their major income from extending good quality loans. That is why converting deposits into standard quality loans determines commercial banks stable earnings. On the other hand, merely collecting deposits without transforming them into good quality loans does not contribute to the profitability; rather it incurs operating costs to the banks. Therefore, the current studies reasonably expect that $\partial\pi/\delta LTDEP > 0$

OPEXTA: The ratio is referred to operating expense as a percentage of total assets. Operating profit of any bank is calculated by deducting operating expense from operating income. Therefore, operating expense is directly related to the profitability of a commercial bank. If a bank operates with higher amount of operating expense than other banks, the operating income of that bank might be jeopardized due to higher expense. Given the above discussion, the researcher can reasonably expect the ratio $\partial\pi/\delta OPEXTA < 0$

CAR: This ratio is represented by (Tier I capital+ Tier II capital)/Risk weighted assets. Capital adequacy ratio refers to the amount of equity and other reserves which a bank holds against its risky assets. The purpose of this reserve is to protect the depositors from any adverse and unpredicted loss. Two types of capital are commonly used as a measure of capital namely tier one capital which can absorb losses without a bank being required to cease trading, and tier two capital, which can absorb losses in the event of a winding-up and so provides a degree of protection to depositors (Basel Committee on Banking Supervision,1988). Basel Committee on Banking Supervision (1988) proposes minimum capital adequacy of international banks to strengthen the soundness and stability of the international banking system. The framework of Basel I accord aims towards assessing capital requirements in relation to credit risk alone. Therefore, capital adequacy ratio is considered as an indicator of credit risk management and thus bank profitability determinant (Li & Zou, 2014). Therefore, the researcher can expect $\delta\pi/\delta\, CAR > 0$

GDPGR: This ratio represents the growth rate in gross domestic product from year to year basis. GDP is the key indicator of the economic development of any economy. When a country experiences a stable growth in GDP, it can be reasonably said that the country is doing well in terms of economic activities. A well-functioning economy usually demonstrates a steady growth in GDP. To support the GDP growth, higher number of financial activities occur at that time. Therefore, it can be reasonably said that during booming situation, commercial banks of the country might reap better profit from the increasing number of economic activities. Thus it is predicted that $\delta\pi/\delta GDPGR > 0$

CPI: This variable indicates the consumer price index. This is a macroeconomic indicator which represents the price level of the daily commodities that are purchased by common people on a regular basis. The higher index is an evidence of the rising price level of the daily commodities. When the price level of an economy gets higher, the cost of funds might get higher also. The higher cost of funds discourage the business organizations to borrow money from the existing financial institutions of the country. This situation may result in the significant amount of idle funds in the vaults of commercial banks. Thus the inability of extending loans due to higher interest rate caused by inflation in price level might decrease the profitability of commercial banks. Thus the researcher can predict that the ratio $\delta\pi/\delta CPI < 0$

LNASSET: The variable indicates the logarithm of total assets of a commercial banks. Asset size represents the size of the corresponding commercial banks. If a bank has higher amount of assets than other banks, then the bank would be called big bank. Sometimes asset size might give operational efficiency to any commercial banks. Consequently, this operational efficiency might result in higher amount of profitability compared to other banks. If the bank with higher asset size is not efficient in extending loans or the loan portfolio is lower than the banks with lower asset size, then that bank would not be called big bank. Therefore, the sign of the coefficient of the specific regressor might be $\delta\pi/\delta LNASSET > $ or $ < 0$

INTMARGIN: The variable represents the difference between the lending rate and deposit rate of commercial banks. The higher the interest margin is, the higher the profitability of commercial banks is. That is why higher interest margin usually results in higher operating income. Therefore, the present research has a prior expectation

of getting a positive association with banks' performance: $\partial \pi / \delta INTMARGIN > 0$

Dummy: The current study has incorporated a dummy variable representing the large bank. The study tries to explore whether the large banks outperform the small banks in terms of earning profitability. Thus the sign of the variable $\delta \pi / \delta\ Dummy >$ or < 0

The following table contains the measurement of the variables and their expected sign on performance: Descriptive Statistics. The descriptive statistics of the included variables has been presented in the following table. In this part, the mean, standard deviation, minimum, and maximum values are given for all variables.

Table 12: Mean, Std. dev, Min, and Max of the variables

Variable	Mean	Std. Dev.	Min	Max
ROA	.014	.009	-.003	.073
ROE	0.161	0.091	-0.243	0.491
TLTA	.643	.074	.073	.765
LLPTA	.013	.010	0	.071
LTDEP	.802	.137	.014	.013
OPEXTA	.031	.056	.011	.778
CAR	.187	.721	-.125	8.6
GDPGR	.061	.006	.050	.071
CPI	.070	.016	.054	.107
LNASSET	25.651	.518	22.493	26.534
INTMARGIN	3.929	1.074	1.87	5.52

From the above table, we can see that on an average the commercial banks experience 1.43% ROA throughout the period starting from 2009 to 2016. However, some banks did not earn a positive after tax income in some years, which has been depicted by the minimum value of ROA -.3966%. Moreover, the standard deviation of ROA over the periods across the 23 listed banks is 0.91%. In case of ROE, we can see that commercial banks earn an average 16.1% with a standard deviation of 9.1%. It is observable that ROE represents more variability than ROA. Likewise ROA, some commercial banks have negative ROE, meaning that they had negative income for some years. In case of total loan to total assets, we can see that on an average loans constitute 64.35% of the total assets. However, the standard deviation is 7.43%, meaning that the variability is higher in case of total loan to total assets compared to ROA.

We can see that commercial banks maintain 1.32% provision for the doubtful loans from their operating income each year. However, some banks did not maintain any provision in some years, which has been supported by the minimum value 0. In case of loan to deposit ratio, commercial banks on an average extend 80.24% of their deposits as loans, which indicates that almost all the deposits collected by commercial banks are extended as loans. However, the variability is higher in this case compared to other variables, which is supported by 13.77% standard deviation. In case of operating expense as a percentage of total assets, we get that on an average commercial banks have 3.12% of their total assets as their operating expense. However, the variability in case of this variable is moderately high compared to the other variables, which is supported by 5.66% standard deviation. In case of CAR, commercial banks maintain on an average capital which is 18.79% of the risk weighted assets. However, the variability is the highest in case of this variable as we can see the standard deviation is 72.16%, meaning that all the banks do not uniformly maintain capital as a percentage of risk-weighted assets.

We can see that Bangladesh economy had earned an average 6.1% GDP growth rate throughout the years 2009 to 2016 with a standard deviation of 0.6%. The minimum GDP growth rate was 5.0%, while the maximum was 7.1%. All the remaining variables such as cpi, Lnasset, and Intmargin have been reported in the same manner in the above table. The results of the correlation matrix have been presented below.

Table 13: Correlation Matrix of the variables

	ROA	ROE	TLTA	LLPTL	LTDEP	OPEXTA	CAR	GDPGR	CPI	LNASSET	INTMARGIN
ROA	1										
ROE	0.797	1									
TLTA	0.1955	0.2032	1								
LLPTL	0.0961	0.0436	-0.2365	1							
LTDEP	0.105	0.0306	0.4031	-0.1839	1						
OPEXTA	0.05	0.0123	-0.0267	-0.0586	-0.0103	1					
CAR	-0.1245	-0.1527	-0.0196	-0.0814	-0.0163	-0.0205	1				
GDPGR	-0.4112	-0.4709	0.0589	-0.1654	0.2306	-0.1581	0.1652	1			
CPI	-0.2103	-0.2226	-0.0497	-0.0926	0.0462	-0.0642	-0.1009	0.1276	1		
LNASSET	-0.496	-0.5342	0.0003	-0.0083	0.2459	-0.1299	0.0759	0.5538	0.2079	1	
INTMARGIN	0.4663	0.4844	0.0588	0.1927	-0.0562	0.1127	0.0238	-0.3572	-0.4008	-0.3873	1

From the above table 13, we can see that the pairwise correlation between the variables are not so strong between two independent variables. On the other hand, some variables demonstrate a strong correlation with dependent variables, thereby ensuring the robustness of the overall model. This condition is a prerequisite to run a regression model controlling for multicollinearity problem. If the correlation between two independent variables were high, the multicollinearity problem would overstate the explanatory power of the regression model. Another problem might occur due to multicollinearity problem that is the standard error related to the affected coefficients might get too large causing the probability value too small. This situation prevents the rejection of a false null hypothesis, causing the type II error. Consequently, this erroneously fitted model declines the authenticity of the model and misrepresents the authenticity of the association of the explanatory variables and dependent variable. However, the present research will get free from this type of problem and would produce a robust model with good explanatory power.

5. Empirical Results

The results of the Random effect-GLS have been presented in the following table. From table 14, we get that the model has an overall explanatory power of 46.91% while considering ROA as the dependent variable. However, we get the overall explanatory power 47.74% when ROE was selected as the dependent variable. According to the result of random effect- GLS regression, 46.91% variability in the performance, measured by ROA, of commercial banks in Bangladesh has been explained by the eleven explanatory variables. The Wald χ^2 statistics is 168.12 in case of the first model, and 160.61 in case of the second model with the corresponding probability 0.000 in both cases, which suggests that the null hypothesis of the coefficients of all the explanatory variables ($\beta_{jt} = 0$) is rejected. Therefore, it can be concluded that the slopes are significantly different from zero. Among the explanatory variables having significant impact on bank performance are TLTA, EQTA, LTDEP, OPEXTA, GDPGR, LNASSET, INTMARGIN, and DUMMY representing size, while the explanatory variables such as LLPTL, and CPI do not have any significant effect on both the banks' performance measured by ROA and ROE.

Table 14: Results of the random effect GLS for both ROA and ROE

	(1) *ROA*	(2) *ROE*
TLTA	0.014* (0.008)	0.151* (0.079)
LLPTL	0.048 (0.052)	-0.130 (0.521)
EQTA	0.020*** (0.008)	0.137* (0.078)
LTDEP	0.016*** (0.004)	0.082* (0.044)
OPEXTA	-0.007 (0.009)	-0.166* (0.089)
CAR	-0.0006 (0.001)	-0.011 (0.007)
GDPGR	-0.128** (0.106)	-3.204 (1.081)
CPI	-0.004 (0.031)	-0.155 (0.326)
LNASSET	-0.009*** (0.002)	-0.059*** (0.015)
INTMARGIN	0.002*** (0.001)	0.023*** (0.006)
DUMMY	0.004*** (0.002)	-0.006 (0.017)
R-Sq	0.4691	0.4774
Wald Chi 2 (11)	168.12	160.61
Prob> F	0.000	0.0434

Standard errors are in parentheses. * $p<0.1$, ** $p<0.05$, *** $p<0.01$

From the above results, we get that there is a significant positive relationship between TLTA and ROA, and the same significant association exists between TLTA and ROE as well. It means that extending good quality loans contribute to the bottom line of commercial banks, thereby influencing on both the performance ROA and ROE to rise. Another significant positive association has been observed between EQTA and each performance measure separately. Having a considerable amount of equity helps commercial banks to absorb any unprecedented loan losses, thereby keeping the ability to extend loans same as earlier. Therefore, higher amount of equity as a percentage of total assets is likely to get translated into higher performance. In the second model, it has been demonstrated that OPEXTA has a significant negative association with performance. However, OPEXTA does not have any significant association with ROA.

The results of the model demonstrate that GDPGR has a significant negative impact on banks' performance measured by ROA. However, the variable GDPGR does not have any statistically significant association with ROE. The plausible reason behind this negative effect on ROA, at the time of economic growth, businesses take more loans to support their rising demand of their products and services, thereby causing a significant amount of loans to get default. The finding has the conformity with the study conducted by Alper & Anber (2011), which also reported a negative association between GDP growth and banks' performance in the context of Turkey. However, this finding contradicts with the findings of other studies conducted by Demirguc-Kunt and Huizinga, 1999; Bikker and Hu, 2002, which indicated a positive association between ROA and GDP growth. The present study finds a non-significant negative association between CPI and ROA, which has the similarities with the

findings of other studies such as Sufian and Habibullah (2009); Samad (2015). The unanticipated rise in the inflation might prohibit commercial banks to adjust their interest rate, thereby causing the decrease in interest revenue and increase in operating costs. The present study demonstrates another significant association between logarithm of asset size and banks' performance. We get a negative association between asset size and banks' performance in both the models, which might be resulted from the existence of considerable amount of fixed assets, investment in low return stocks and bonds, and significant amount of idle money in the vaults. However, the finding contradicts with other studies conducted by Smirlock (1998); Alper & Anbar (2011), which reported a positive association between logarithm of assets and ROA.

The present study indicates a statistically significant positive association between INTMARGIN and banks' performance in both the models. Higher interest margin is likely to contribute in a positive manner on the both performance measures: ROA and ROE. The direction of the association has been matched with our prior expectation.

Another interesting finding of the study is demonstrated by the statistically significant positive association between dummy variable representing the relative size of the commercial banks and performance measured by ROA. This dummy variable has been included in terms of relative asset size of the commercial banks to explore any underlying association between size and performance of commercial banks. The banks having larger asset size have been treated as the large bank. This finding has been corroborated by the findings of other studies such as Chirwa (2003); Kosmidou (2008), which also reported the positive association of banks' size and performance. The reason behind the positive association is large banks might have the operating efficiency compared to small banks, thus increasing their profitability. Large commercial banks usually have good positioning in the minds of customers, and that is why they tend to lend their surplus amount of money, at lower interest rate, to the large banks.

6. Conclusion

Profitability is critical to the long term survival of commercial banks especially in the changing environment of banking industry in the context of Bangladesh. The study examines the relevant factors that might have any association in explaining profitability of commercial banks. To fulfill this aim, the research has collected a panel data from 23 listed commercial banks of Bangladesh and run random-effect GLS regression to get the efficient estimates of the regression coefficients. The study reveals that total loans to total assets, bank equity to total assets, loans to deposits have a significant positive association with bank performance. Moreover, interest margin and dummy representing size both have positive impact on banks' performance. The study points out that GDP growth rate, operating expense to total assets, and logarithm of assets all have negative effect on banks' performance.

This research would cater to the needs of various groups of stakeholders such as, banking practitioners, regulators, and the prospective investors. Top management of the commercial banks would get to know the relevant factors that might influence performance, thus enhancing the profitability of commercial banks. The study opens the door for future research by incorporating variables related to loan quality such as non-performing loan ratio, and variable related to financial market development such as banking sector asset to GDP to get more meaningful insight about the profitability determinants of commercial banks in the context of Bangladesh.

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Note

Note1: scheduled banks can perform all functions of commercial banks, but non-scheduled banks are licensed only for specific functions and objectives.