Determinants of Bank Profitability
In Bangladesh

Khan A. Matin[*]

Abstract: *This study attempts to investigate the influence of various bank specific and macroeconomic determinants of bank profitability by taking 47 commercial banks of Bangladesh during the period 2010-15. Three different measures of profitability namely return on assets (ROA), return on equity (ROE) and net interest margin over total assets (NIM) are used in the study. The data are from the annual reports of individual banks, BFID annual reports, and various publications of the Bangladesh Bank and Bangladesh Bureau of Statistics. The Feasible Generalised Least Squares (FGLS) model for panel data has been applied to estimate the effect of the explanatory variables. The result indicated that nonperforming loans, loan loss provisions, bank size, cost efficiency and liquidity had significant negative effect on ROA, while non-traditional activities measured by non-interest income and off-balance sheet activities had significant positive effect on ROA. In the model for ROE, loan loss provision and cost efficiency had significant negative effect. The equity capital, loan loss provision, non interest income, cost efficiency and liquidity had significant positive effect on NIM, while bank size and off-balance sheet activities had significant negative effect on NIM. We find no significant impact of the macroeconomic variables-rate of growth of real GDP and inflation rate included in the models on profitability. The financial soundness indicators of Bangladesh compare well with those from countries like India, Pakistan, Sri Lanka, China, Indonesia, Thailand and Vietnam.*

Keywords: bank profitability, panel regression analysis, Bangladesh.

JEL Classification. C23 G01 G21 N25

---

[*] Professor (Formerly), Institute of Statistical Research and Training (ISRT), University of Dhaka
    E-mail: kmatin@isrt.ac.bd/kmatin_isrt@yahoo.com

Introduction

The banking system is the most important element of the financial system in Bangladesh. Various estimates puts the share of banking assets to the total financial system assets well over 60 per cent. The Banking assets to GDP ratio is about 71 per cent. In Bangladesh banks function as the main players in channeling funds from lenders to borrowers, therefore it is important that their intermediary role provides a higher welfare for the society, possibly at lower costs. It falls on the banks to bridge the gap between savers and borrowers and to perform all tasks associated with the profitable and secure channeling of funds. The banking sector also plays an important economic role in providing financial intermediation and economic acceleration by converting deposits into productive investments. An efficient financial system improves banks' profitability by increasing the amount of funds available for investment, while enhancing the quality of services provided for the customers (Saona, 2011). Banks are such types of business where deposits are considered as liabilities and issuing debt securities are considered as assets on the other part (Fama, 1980). Commercial Banks incur costs for their liabilities and earn income from their assets. Thus profitability of banks is directly affected by management of their assets and liabilities. In addition, different market and macroeconomic factors also influence the ability of the banks to make profits (Short, 1979; Molyneux and Thornton, 1992; Athanasoglou et al, 2008). If a financial system is efficient, then it should show profitability improvements, increasing volume of funds flowing from savers to borrowers, and better quality services for consumers (Sufian & Habibullah, 2009). In Bangladesh, banking institutions are playing significant roles in the expansion of the financial system and the economy of the nation. It is notable that, the banking sector of developing countries is less stable than developed countries (Beck & Rahman, 2006; Sufian & Habibullah, 2009; Uddin & Suzuki , 2011).

As a guardian of all commercial banks, Bangladesh Bank-central bank of Bangladesh has been taken a series of actions to improve the soundness, competitiveness, and efficiency of the banking system. Among them, changes relating to ownership, market concentration, regulatory measures and policies have taken place to improve banking performance. Although Bangladesh Bank has been taken some measures to stabilize the financial system and build confidence in the banking system, it is still relevant to know what factors affect banks profitability in order to influence policy making in the banking sector in Bangladesh.

Literature Review

A good number of studies on the determinants of profitability of the commercial banks in Bangladesh have been conducted but only in recent years. Here we are concentrating on the findings of empirical works conducted in Bangladesh.

Sufian and Habibullah (2009**)** **s**tudied the performance of 37 Bangladeshi commercial banks for the period 1997 to 2004 and found that bank specific characteristics, in particular loans intensity, credit risk, and cost have positive and significant impacts on bank performance, while non-interest income exhibits negative relationship with bank profitability. The empirical findings suggest that size has a negative impact on return on average equity (ROAE), while the opposite is true for return on average assets (ROAA) and net interest margins (NIM). As for the impact of macroeconomic indicators, they found no significant impact on bank profitability, except for inflation which has a negative relationship with banks profitability.

Sufian and Kamarudin(2012) studied bank specific characteristics and macroeconomic determinants of profitability in the Bangladesh's banking sector over the years 2000 to 2010 on a sample of 31 commercial banks. The multiple regression results found five bank specific determinants that are important in influencing profitability:capitalisation, non-traditional activities, liquidity, management quality, and size of the bank. Besides, three macroeconomic determinants significantly influence profitability including growth in GDP, inflation and concentration.

Rahman et al (,2015) studied potential determinants of bank profitability by taking 25 commercial banks from Bangladesh for a period from 2006 to 2013. Three different measures of profitability namely return on assets (ROA), net interest margin over total assets (NIM) and return on equity (ROE) are used in the study. The empirical findings suggest that capital strength (both regulatory capital and equity capital) and loan intensity has positive and significant impact on profitability. Results also show that cost efficiency and off-balance sheet activities have negative and significant impact on bank profitability. The impact of other variables is not uniform in respect of different measures of profitability. Non-interest income, credit risk and growth rate of GDP are found as important determinant for NIM. Size has a positive and significant impact on ROA. Inflation has a negative and significant impact on ROA and ROE.

Jahangir et al(2007) while analyzing data on 15 commercial Banks listed in Dhaka Stock exchange for the period 2000-2005 found that market concentration and bank risk do little to explain bank's return on equity, whereas bank's market size

is the only variable providing an explanation for bank's return on equity in the context of Bangladesh

Uddin and Suzuki (2011) analyzing data on 38 commercial banks for the period 2001-2008 found that income and cost efficiency of sample banks have increased by 37.84 percent and 15.28 percent respectively in 2008 compared to 2001. Similarly, non-performing loans and return on assets also report improvement in bank performance. The results generated by regression models indicate that foreign ownership has a statistically significant positive impact on bank performance. On the other hand, private ownership has favorable impact on income efficiency, return on assets, and non-performing loans, whereas negative impact on cost efficiency.

Sayeed et al (2012) while applying Statistical Cost Accounting (SCA) methods on 18 commercial banks for the period 1995-2006 found that the high earning banks experience higher returns from their assets and lower returns from their liabilities than the low earning banks. Results are inconclusive with regard to private banks' and public banks' returns. This study finds that assets management of large commercial banks is better than those of small banks, but they are not better than small banks in respect of liability management.

Samad(2015)   examines the impact of bank specific characteristics and macroeconomic variables in determining the banks' profitablity of Bangladesh banking industry with a panel data. A total of 42 Bangladesh commercial banks' financial reports were analyzed; and bank specific characteristics such as bank financial risk, bank operational efficiency, and bank sizes as well as macroeconomic variables such as economic growth are examined to estimate their impact of bank profits. Results indicate that 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 are significant factors. Bank sizes and macroeconomic variable show no impact.

Abdullah et al (2014): The study examines the bank-specific, industry-specific and macroeconomic determinants of 26 DSE listed bank's profitability in Bangladesh during 2008 to 2011. The empirical results show that the profitability of the Bangladesh banking sector is determined by bank size, higher cost efficiency, capitalization, and higher concentration, regardless of whether ROA or NIM is used as the dependent variable. Credit risk and ROA have a negative relation, whereas the relationship with NIM is positive. Inflation is significantly related to NIM but not with ROA, and labor productivity and nontraditional activity have a positive effect on ROA only.

Hossain, 2010) analyzes interest rate spreads and margins in banking in Bangladesh for the period 1990-2008. The application of the Arellano-Bover/Blundell-Bond dynamic panel regression model to a panel of 43 banks for the period 1990-2008 reveals persistency in interest spreads and margins. The model also identifies that high administrative costs, high non-performing loan ratio and some macroeconomic factors are the key determinants of persistently high interest rate spreads and margins. Persistently high spreads and margins in old private banks (established before 1999) are attributed to a certain degree of market power in the post-liberalization period (after 1999). These factors together imply a lack of competition and efficiency in the banking sector of Bangladesh despite financial reforms.

Jahan (2012) conducted study on randomly selected six commercial banks of Bangladesh. This study uses widely used determinants of banks' profitabilities, which are ROA, ROE and ROD and these are also commonly used criterion of Bangladesh Bank to evaluate banks' performance. The results of regression analysis found the explanatory variables - operational efficiency, asset size and ROD to be positively related and asset utilization to be negatively related to ROA, but these associations are statistically insignificant.

Objective of the study

The study investigates the capital, risk, size, non-interest income to total assets, cost-to-income ratio, off balance sheet items to total assets, liquidity, Concentration, GDP growth rate, and inflation as potential determinants of banks' profitability in Bangladesh. The level and trend of the financial soundness indicators of the banks are also investigated.

Data and Methodology

Data of all bank specific variables were obtained from the Websites of the respective banks. The annual data of 47 commercial banks for the sample period 2010 to 2015 have been used to estimate the model involving panel data. The data were compiled from Annual Reports and Financial Statements of individual banks, Annual Reports of Bank and Financial Institution Division (BFID) and publications of Bangladesh bank and Bangladesh Bureau of Statistics. Current statistics generated by Bangladesh Bureau of Statistics, Bangladesh Bank and Ministry of Finance have also been used particularly for macroeconomic variables. The online data maintained by ADB, OECD, World Bank and IMF have also been used. All ratios are estimated by the author. The panel variable (Banks)

was balanced. The Feasible Generalised Least Squares (FGLS) model for panel data has been applied to estimate the effect of the explanatory variables(White, 1980). The estimation of the regression equations has been carried out using the STATA12   package. The list of banks selected for the present study is given in Annex I.

Variables

Dependent Variable: Profitability

Bank profits have been expressed by three approaches (i) Return on assets (ROA) (ii) Return on equity(ROE) and (iii) Net Interest Margin(NIM).

To examine the relationship between the efficiency of the banks and explanatory variables, the standard regression model is used and it could be defined as follows for observation (bank) i by using the profitability scores as dependent variable, this study extends equation (1) and estimates the following model:

Where Π_{it} = α_0 + β X_{it} + ε_{it} i = 1 …… N   (1)

Π_{it} is the profitability (ROA, ROE, & NIM of the ith bank in the period t

(α_0, β) is a vector of parameters

X_{it} is a vector of explanatory variables, ε_{it} is a stochastic error term

The description of variables and their measurements are given in Table 1.

Movement of Financial Soundness Indicators: 2000-15

Some important financial indicators conducive to profitability of the commercial banks is discussed in this section. The analysis is based on the published data from the Annual reports of Bangladesh Bank-central bank of Bangladesh.   The movement of the time series annual data is analysed for the period 2000-2015.

Banking Sector Assets

The formal financial sector of Bangladesh includes all regulated institutions like Banks, Non-Bank Financial Institutions (FIs), Insurance Companies, Capital Market Intermediaries like Brokerage Houses, Merchant Banks etc.; Micro Finance Institutions (MFIs). It thus consists of money market (comprising operations of the banking system, microcredit institutions, nonbank financial institutions, interbank foreign exchange market), the capital market (stock markets), bond market and the insurance market. The formal financial sector in
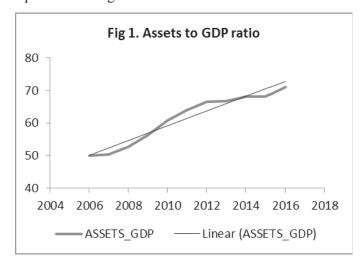
Table 1: Description of the variables used in the regression models.

Variable	Description	Proxy	Hypothesised Relationship
Dependent			
ROA	Net profit after tax divided by total assets	Profitability	Not applicabl
ROE	Net profit after tax divided by shareholders' equity	Profitability	Not applicabl
NIM	Difference between interest earned and interest Expended by a bank divided by its total assets	Profitability	Not applicabl
Independent			
Bank specific characteristics(internal determinants)			
CRAR	Capital to risk weighted assets	Capitalisation	+/-
EQUITTA	Total book value of shareholders equity over total assets	Capitalisation	+/-
NPLTL	Ratio of non-performing loans to total loans	Asset quality	-
LLPTL	Loan loss reserve over gross loan	Asset quality	+/-
SIZE	Log of Total assets	Bank size	+/-
NIITA	Non-interest income over total assets	Non-traditional activities	+
OBSTA	Total of off-balance sheet activities divided by total assets	Non-traditional activities	+
NIE-INC	Ratio of Expenditure to income	Cost efficiency	+
NIETA	Non-interest expenses over total assets	Management quality	+/-
LIQUIDITY	Total loans over total assets	Liquidity	+/-
Macroeconomic variables(external determimants)			
GDP	annual gdp growth rate	Economic growth	+/-
INFL	annual CPI inflation rate	Inflation	+/-
CR5	Five largest banks assets concentration ratio	Banking sector concentration	+/-

Bangladesh mostly consists of banks. According to a recent estimate (Mansur, 2015) banking sector assets accounted for 63 per cent of the total assets of the formal financial sector in 2013. Mujeri and Younus(2009) observed that banking sector accounts for around 96 per cent of the assets of the financial sector. WB(2006) recorded the banking assets as percentage of total financial assets as 87 per cent for the year 2004 in Bangladesh. However along with the development of the capital market the share of the assets of the banking sector shall have to be compromised. There is paucity of data in this aspect. The ratio of banking sector assets to GDP in 2016 was 71.13 per cent.
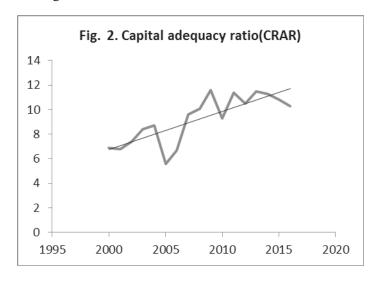
Assets to GDP Ratio

The Banking industry assets to GDP ratio was computed for the period FY2006 to FY2016 using the GDP at current prices of 2005/06 base. For the year 2006, the asset-GDP ratio was 49.9 per cent which steadily increased to 71.13 per cent in 2016. The mean value of the Asset-GDP ratio was 61.35 per cent for the period under consideration 2006-2016 and the least squares growth rate was found to be 4.08 per cent per annum. Fig 1 and table 2.

Fig 1. Assets to GDP ratio

Regulatory Capital to Risk-Weighted Assets Ratio

Capital adequacy measures the loss absorption capacity of the banks, related to credit, market, operation, interest rate, liquidity, reputation, settlement, strategy, environment and climate change, etc. Under Basel-III, banks in Bangladesh are instructed to maintain the Minimum Capital Requirement (MCR) at 10.0 percent of the Risk Weighted Assets (RWA) or Taka 4.0 billion as capital, whichever is
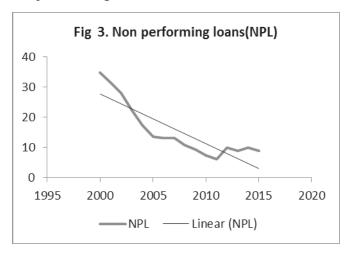
higher. The risk-weighted capital adequacy ratio is a measure of bank's capital and is used to protect depositors and promote the stability and efficiency of financial systems around the world. The value of CRAR was 6.9 per cent in 2000 which increased to 8.7 per cent in 2004 and   declining for the following years it recorded a low value of 6.7 percent in 2006 and since then it exhibited a rising tendency reaching up to 11.6 per cent in 2009 followed by a decrease to 9.3 per cent in 2010. In the subsequent years   it has been fluctuating around 11 per cent. During the year 2015 the CRAR for was 5.4 per cent, for DFIs it was -32.0   per cent, for PCBs it was 12.4 per cent and for FCBs it turned out to be 25.6   per cent. The overall mean CRAR for the Banking industry was found to be 10.8 for the year 2015. In March 31, 2016, the CRAR was 10.62 per cent, which is similar to the latest requirement. Until December, 2015, the banks had to maintain a capital adequacy ratio at 10 per cent, but from January 2016 to 2019 banks will have to maintain their capital adequacy at 0.625 per cent in addition to 10 per cent of their CRAR. The least squares growth rate of the CAR during the period 2000-15 was found to be 3.04 per cent per annum. But it was statistically insignificant. The mean CRAR per annum for the entire period under consideration was 9.16 per cent. Bangladesh Bank took initiative to improve bank's financial health by increasing their CRAR in line with Basel III standards which was introduced in January 2016. Figure 2 and table 2.

Fig. 2. Capital adequacy ratio(CRAR)

Non Performing Loans(NPL)

Non-performing loans, which puts a brake on the recycling of banking business, reduce banks. It is well-known that profitability of banks shrinks because of non-
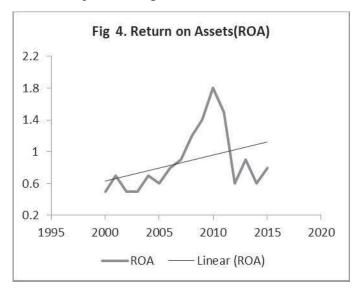
performing loans the lending capacity of the banks. Banks always try to create a reserve fund from their income to offset bad debts. Banks need to create high percentage provision to cover high percentage of non-performing loans. All kinds of NPLs reduce the profitability of the banks and banks encounter problem of low capital base which badly affects the banking sector. Credit facilities are the main product of banks and granting credit is a vitally important decision for the banks because it determines their profitability. Non-performing loans have been a matter of concern for the last few decades. The mean value of NPL for the entire period 2000-15 was 15.32 per cent and the least squares growth rate was negative 8.60 per cent per annum. The value of the regression coefficient was statistically highly significant. The value of NPL was quite high—34.9 per cent in 2000 which steadily declined to 6.`1 per cent in 2011 after which it again increased to 10 per cent in 2012 and for the yeas 2015 it is slightly above 10 per cent. During the year 2015 , the value of NPL was 21.5 per cent for SOCBs, 23.2 per cent for DFIs , 4.9 per cent of PCBs and 7.8 per cent for FCBSs. For the banking industry the value of NPL was 8.8 per cent. Figure 3 and table 2.

Fig 3. Non performing loans(NPL)

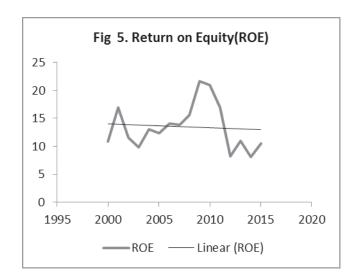**Return on Assets (ROA)**

.In the year 2000 the value if ROA was 0.5 per cent which after showing some volatility up to the year 2005 shown an upward movement reaching 1.8 per cent in 2006, after which it again declined to 0.6 per cent in 2012, after experiencing some fluctuations it reached a value of 0.8 per cent in 2015. The overall mean value of the return on asset(ROA) was 0.87 per cent during the period 2000-15 and the least squares growth rate was 2.02 per cent per annum. The regression coefficient was statistically highly significant. During the year 2015, the value

ROA was found to be -0.04 per cent for SoCBs,-1.2 per cent for SoSB/DFIs, 1.00 per cent for PCBs and 2.9 per cent for FCBs. The ROA for the banking industry turned out to be 0.8 per cent. Figure 4 and table 2.
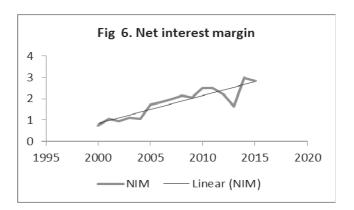

Return on Equity (ROE)

In the year 2000, the value of ROE was 10.9 per cent which increased to 16.9 per cent in 2001, then decreasing to 9.8 per cent in 2003 after which it reached its highest value of 21.7 per cent in 2009. But the value of ROE showed large scale decline to 8.2 per cent in 2014. The overall mean value of the return on

equity(ROE) for the period under consideration was 13.22 per cent and the least squares growth rate was found to be -1.98 per cent per annum During the year 2015, the value of ROE was found to be -1.5 per cent for SCBs, -5.8 per cent for SBs/DFIs, 10.8 per cent for PCBs and 14.6 per cent for FCBs. the overall value of ROE ended up in 10.5 per cent. Figure 5 and table 2.

Net Interest Margin (NIM)

The net interest margin (NIM) has been obtained in the present study as a ratio of net interest income to total assets. During 2000 the value of NIM was 0.76 per cent which gradually increased to 2.61 per cent in 2010 followed by a decrease to 1.65 per cent in 2013. The value of NIM increased to 3 per cent in 2014 and in 2015 it had a value of 2.84 per cent. The mean value of NIM for the period under consideration is found to be 1.83 per cent and the least squares growth rate was 8.32 per cent per annum During the year 2015, the value of NIM was found to be 1.42 per cent for SCBs, 0.58 per cent for DFIs, 3.84 per cent for PCBs and 5.31 per cent for the FCBs, the overall performance of the industry showed an NIM of 2.84 per cent, due mostly by the courtesy of the FCBs and PCBs. Figure 6 and table 2.

Fig 6. Net interest margin

The financial soundness indicators of 2015 compares well with those from countries like India, Pakistan, Sri Lanka, China, Indonesia, Thailand and Vietnam. Table 3.

Table 2: Least Squares Growth Rate of Some Financial Soundness Indicators :2000-2015.

FSI Indicators	N (Mean)	Regression Coefficient (β^*)	t-ratio	P-value	R square	Least Squares Growth Rate(%)	D-W
CRAR	16(9.16)	.03	0.75	.468	.04	3.04	1.52
NPLTL	16(15.32)	-.09	6.41	.000	.73	-8.60	1.22
ROA	16(0.87)	.02	4.44	.000	.44	2.02	0.75
ROE	16(13.22)	-.02	1.18	.257	.08	-1.98	1.22
NIM	16(1.83)	.08	7.34	.006	.42	8.32	1.86
ASSET-GDP	11(61.35)	.04	10.81	.000	.93	4.08	0.53

Source and Notes. Bangladesh Bank. Author's Computation
The Regression line is $\ln X_t = \alpha + \beta T$. The average annual growth rate
$r = [\exp^{\beta^*} - 1] \times 100$,   where β^* is the least squares estimate of β.
ASSETS_GDP ratio is for the period 2006-2016.

Empirical Findings. Panel Data 2010-2015

Correlation Analysis

The correlation matrix of the explanatory variables used in the multiple regression analysis was examined and it shows that in general the correlation between the bank specific variables is not strong thus suggesting that multicollinearity problems are not severe.

Regression Analysis

The result of the Mulitiple Regression Analysis under Feasible Generalised Least Squares model is given in table 4.

Capitalisation

Two concepts of capital are mainly used in literature, for example (i) actual capital and (ii) regulatory capital. Actual capital is also known as physical capital which is composed of equity and long-term debt and is represented in the balance sheet of banks. It is usually measured as the ratio of equity to total assets and also known as capital ratio and capitalisation (EQUITTA). This coefficient is expected to have positive effect on profitability (Abreu and Mendes 2001, Casu and Girardone 2004, Carvallo and Kasman 2005, Athanasoglou, Brissimis and Delis

Table 3: Financial Soundness Indicators:Some selected countries

Indicators	Bangladesh	India	China,PR Mainland	Pakistan	Sri Lanka	Indonesia	Thailand	Vietnam
Time	2015A1	2016Q3	2016Q2	2016Q3	2016Q3	2016Q3	2016Q3	2015A1
Regulatory Capital to Risk-Weighted Assets	10.6	13.1	13.1	16.8	14.1	20.6	18.2	10.1
Non-performing Loans to Total Gross Loans	8.4	8.8	1.7	11.3	2.9	3.0	3.1	2.3
Return on Assets	1.4	0.4	.6	1.3	1.5	1.7	1.4	0.4
Return on Equity	16.6	5.1	7.6	14.2	18.5	11.7	11.0	5.4
Interest Margin to Gross Income	68.9	62.0	74.3	71.6	25.3	70.0	62.0	74.4
Non-interest Expenses to Gross Income	49.0	49.9	26.7	52.2	32.7	46.5	46.5	55.8
Liquid Assets to Total Assets	21.0	8.5	21.6	49.5	28.3	21.8	18.9	13.2
Capital to Assets	5.4	7.4	8.1	7.9	7.8	15.0	10.7	9.3

Source. IMF. Financial Soundness Indicators. All Countries Latest Available Data (FSI).
Data Extracted from IMF eLibrary Data on 2/10/2017 11:49:51 PM

2008, Sufian 2009). The variable EQUITTA had highly significant (P< .01) positive effect on NIM but insignificant positive effect on ROA and insignificant negative effect on ROE.

Regulatory capital is the capital based on risk which is maintained in accordance with the rules determined by supervisor in a country. This capital is measured as the ratio of capital to risk-weighted assets and also known as risk-based capital adequacy ratio (CRAR). Studies have found mixed results on the effect of capital adequacy ratio on profitability. Some studies obtained positive effect of CRAR on

Table 4: Multiple Regression Analysis Result Under FGLS model.

Variable	Model 1 ROA	Model 2 ROE	Model 3 NIM
Independent variables			
CRAR	.011(.005)**	.038(.116)	.001(.005)
EQUITTA	.001(.005)	-.117(.106)	.014(.005)***
NPLTL	-.015(.008)*	-.171(.170)	-.007(.008)
LLPTL	--.497(.031)***	-3.417(.640)***	.057(.030)*
SIZE	-.181(.083)**	-2.043(1.719)	-.296(.080)***
NIITA	.525(.101)***	--.875(2.091	.990(.098)***
OBSTA	.009(.004)*	.140(.091)	-.023(.004)***
NIE_INC	-.010(.001)***	-.091(.033)***	.007(.001)**
NIETA	.295(.076)***	1.394(1.572)	.289(.074)***
LIQUIDITY	-.017(.007)**	.088(.152))	.049(.007)***
GDP	-.069(.442)	-.200(9.10)	-.005(.426)
INFL	-.046(.089)	-1.005(1.84)	.057(.086)
CR5	.098(1.398)	3.13(2.88)	-.1355(.135)
Wald χ^2(13)	852.08	93.17	274.28
	(p= .0000)	(p= .0000)	(p= .0000)
Panels	homoskedastic.	homoskedastic.	homoskedastic.
	No autocorrelation	No autocorrelation	No autocorrelation
Number of banks	47	47	47
Number of years	6	6	6
Number of observations	282	282	282

Note. The figures in parentheses are standard error.

***, **, * indicate statistically significant at 1 per cent, 5 per cent and 10 per cent respectively.

profitability while some found the negative effect. The variable CRAR had highly significant (P<.01) positive effect on ROA and NIM, and its effect on ROE was also positive but insignificant.

Asset Quality

We have measured the asset quality by taking the (a) ratio of classified loans to total loans (NPLTL), and (b) loan loss provision to total loans (LLPTL). These are also considered as measure of credit risk. It is an indicator of the ability of the banks to absorb losses from non-performing loans. The coefficient is expected to be negative because bad loans (non-performing loans) could reduce the bank's efficiency level. A better quality asset is described as having lower non-

performing loans or ratio of NPLTL The effect of nonperforming loans (NPLTL) on ROA was negative and significant at 10 per cent level and its effect on ROE and NIM was negative but insignificant. The effect of loan loss provision to total loans (LLPTL) on ROA and ROE was negative and highly significant (P< .01) while its effect on NIM was positive and significant at 10 per cent level.

Bank Size

The bank size (SIZE) has impact on various activities of banks including investing opportunities, portfolio diversification, reputation and access to equity capital. It has been measured by the natural logarithm of the total assets of the bank. As the large banks have easy access to equity capital market, they will have lower capital ratio than smaller banks. As large banks can carry out a large number of different activities, so they can diversify their portfolio, and, hence credit risk will be decreased. However findings on the effect of bank size on profitability have been mixed. Some finding positive impact while some other observed that it had negative impact on profitability. The bank size had significant negative effect on ROA (P<.05) and NIM (P<.01) and insignificant negative effect on ROE.

Non-traditional Activities

Two measures of non-traditional activities have been used in the present analysis-one the ratio of non-interest income to total assets(NIITA), the other one being off-balance sheet activities which is a ratio of off-balance sheet income to total assets (OBSTA). The off-balance sheet activities help banks to raise their sources of income without changing capital structure. Non-interest income consists of commission, service charges and fees, guarantee fees, net profit from sale of investment securities and foreign exchange profit. We expect a positive impact of the non-traditional activities on bank profitability. The effect of NIITA on ROA and NIM was positive and highly significant (P<.01), its effect on ROE was negative but insignificant. The variable OBSTA had significant (P< .10) positive effect on ROA, but its effect on ROE was positive but insignificant. Its effect on NIM was negative and highly significant (P<.01).

Management Quality

We have used two different measures of Management quality-Non-interest expense to total assets (NIETA) and non-interest expense to operational income (NIE_INC). These variables also measures cost-efficiency. These variables are applied to provide the information on variation in operating costs across the

banking system. It reflects total amount of wages and salaries, as well as the cost of running branch and corporate office facilities. This is expected to have a negative relationship between cost to income ratio and profitability. The effect of NIE_INC on ROA and ROE was negative and highly significant ($p<.01$) but its effect on NIM was positive but insignificant. The effect of NIETA on ROA and NIM was positive and highly significant ($p<.01$). Its effect on both ROE was also positive but insignificant.

Liquidity

In this study liquidity has been defined as the ratio of total loan to total assets (LIQUIDITY). It is used to measure bank specific lending intensity. The liquidity refers to the risk of not having enough cash reserves to meet the demands of withdrawals from depositors. The loan structure, especially loans to individuals and firms, is risky than the others forms of credit for example government securities. Bank loans are assumed to be the main source of profitability and are expected to affect performance positively. Nevertheless, the coefficient could also be negative, which indicates a negative relationship between liquidity and profitability because loan-performance relationship depends significantly on the expected change of the economy. (Rahman et al. 2015, Sufian and Kamaruddin. 2012). The effect of liquidity on ROA and NIM was positive and highly significant ($p<.01$). On the other hand its effect on NIM was negative and insignificant.

Macroeconomic Variables

The macroeconomic variables are important to be included into the estimation as control variables because they can deal with the bank efficiency sufficiently. The first macroeconomic variable included in the model is the annual rate of growth of real gross domestic product (GDP). The GDP is expected to influence numerous factors related to the supply and demand for loans and deposits. Favourable economic conditions would positively influence bank profitability. The effect of growth rate of real GDP was negative on ROA, ROE and NIM but insignificant

Another macroeconomic variable is annual rate of inflation measured by consumer price index (INFL). The effects of inflation on bank performance depend on whether the inflation is anticipated or unanticipated. In the anticipated case, the interest rates are adjusted accordingly, resulting in faster increase of bank revenues than costs and subsequently gives positive impact on bank performance.

In the unanticipated case, banks may be slow in adjusting their interest rates, resulting in a faster increase of bank costs than revenue, thus, gives negative effects on bank performance. (Sufian and Kamaruddin, 2012). The variable INFLATION had insignificant negative effect on ROA and ROE and insignificant positive effect on NIM.

Third macroeconomic variable is concentration ratio of the five largest banks (CR5) in terms of assets, which is entered in the regression model as a proxy variable for the impact of banking sector concentration on the profitability of the banks. The structure-conduct-performance (SCP) theory posits that the banks in a highly concentrated market tend to collude, and therefore earn monopoly profits. The effect of CR5 on ROA and ROE was negative but insignificant. Its effect on NIM was positive and insignificant.

Conclusions

The study was carried out with the main purpose of overseeing the financial soundness indicators and identifying the potential bank specific and macroeconomic determinants of bank profitability in commercial banks in Bangladesh. Considering the trend of the industry level annual data on banking assets to GDP ratio, Capital to Risk_assets ratio, non performing loans, return on assets, return on equity and net interest margin for the period 2000-2015, one would be satisfied with the performance of the commercial banks in Bangladesh. Amongst them the Assets to GDP ratio, CRAR, ROA and NIM showed upward trend, while non performing loans and ROE are on the decrease, although ROE experienced a wide range of fluctuations during the period under consideration. The financial soundness indicators compares well with those from countries like India, Pakistan, Sri Lanka, China, Indonesia, Thailand and Vietnam. In the multiple regression analysis on panel data of 47 banks for the period 2010-15, it appeared that all the bank specific variables included in the models exerted significant influence on the three measures of profitability used in the study – ROA, ROE and NIM. But their effect on the profitability had wide range of variation across different measures. The Feasible Generalised Least Squares regression model for panel data has been applied to estimate the effect of the explanatory variables. The results indicated that nonperforming loans, loan loss provisions, bank size, cost efficiency and liquidity had significant negative effect on ROA, while non-traditional activities measured by non interest income and off balance sheet activities had significant positive effect on ROA. In the model for ROE, loan loss provision and cost efficiency had significant negative effect. The

equity capital, loan loss provision, non interest income, cost efficiency and liquidity had significant positive effect on NIM, while bank size and off balance sheet activities had significant negative effect on NIM. The macroeconomic variables- rate of growth of real GDP and annual inflation rate did not exhibit any influence on bank profitability.

References

Abdullah, M. N., K. Parvez and Salma Ayreen. 2014. Bank Specific, Industry Specific and Macroeconomic Determinants of Commercial Bank Profitability: A Case of Bangladesh. World Journal of Social Sciences 4(3):82-96

Afroze, Rubina. 2013. Interest Rate Spread of Commercial Banks: Empirical Evidence from Bangladesh. ASA University Review, 7(2):75-90.

Akhavein, J.; Berger, A. N.; Humphrey, D. B. 1997. The effects of megamergers on efficiency and prices: Evidence from a bank profit function, Review of Industrial Organization 12(1): 95–139.

Albertazzi, U.; Gambacorta, L. 2008. Bank profitability, the business cycle, Journal of Financial Stability, forthcoming.

Alper, D., & Anbar, A. (2011). Bank Specific and Macroeconomic Determinants of Commercial Bank Profitability: Empirical Evidence from Turkey. Business and Economics Research Journal, 2(2), 139-152.

Asimakopoulos, G. I., S. N. Brissimis and M.D Delis. 2008. "The Efficiency of the Greek Banking ystem and Its Determinants." Economic Bulletin, 30(5):7-27.

Athanasoglou, P. P.; Brissimis, S. N.; Delis, M. D. 2007. Bank specific, industry specific and macroeconomic determinants of bank profitability, Journal of International Financial Markets, Institutions and Money 18(2): 121–136.

Coelli, T., D. S. Prasada-Rao and G. E. Battese. 1998. "An Introduction to Efficiency and Productivity Analysis." Boston:Kluwer Academic Publishers.

Dermiguc Kunt, A.; Huizinga, H. 1999. Determinants of commercial bank interest margins and profi- tability: Some International Evidence, World Bank Economic Review 13(2): 379–408.

Dermiguc Kunt, A.; Huizinga, H. 2001. Financial structure and bank profi tability, in Dermiguc Kunt, A. and Levine, R. (Eds.). Financial Structure and Economic Growth: A Cross Country Comparison of Banks, Markets and Development. Cambridge, MA: MIT Press.

Fama, E. F. (1980). Banking in the theory of finance. Journal of Monetary Economics, 6, 39-57.

Goddard, J.; Molyneux, P.; Wilson, J. 2004. Dynamic of growth and profitability in banking, Journal of Money, Credit and Banking 36(6):1069-1090.

Guru, B. K.; Staunton, J.; Balashanmugam, B. 2002. Determinants of Commercial Bank Profi tability in Malaysia.Working Paper. Multimedia University.

Hassan, M. K.; Bashir, A. H. M. 2003. Determinants of Islamic Banking Profitability in the 10th ERF Annual Conference . Morocco Dec 16-18.

Hassan, M. K., & Bashir, A. H. (2005). Determinants of Islamic Banking Profitability. In Munawar Iqbal and Rodney Wilson (Eds.), Islamic Perspectives on Wealth Creation, Edinburgh: Edinburgh University Press.

IMF. 2010. Bangladesh: Financial System Stability Assessment. IMF Country Report No. 10/38

 February 2010.International Monetary Fund. Washington D. C.

IMF. 2016. Bangladesh :Selected Issues. IMF Country Report No. 16/28. January IMF 2016. International Monetary Fund. Washington D. C.

IMF. 2017. Financial Soundness Indicators. All Countries Latest Available Data (FSI). Data Extracted from IMF eLibrary Data on 2/10/2017 11:49:51 PM

Isik, I.; Hassan, M. K. 2003. Effi ciency, ownership and Turkish Banking Industry, Journal of Business Finance and Accounting 30(9/10): 1363–1421.

Jahan, Nusrat. 2012. Determinants of Bank's Profitability: Evidence from Bangladesh. Indian Journal of Finance, 6(2), 32 – 38.

Jahangir, N., S. Shill and M. A. J. Haque. 2007. Examination of profitability in the context of Bangladesh Banking Industry. ABAC Journal 27(2):36-46

Kennedy, P. 2008. A Guide to Econometrics. Sixth edition. Malden, Massachusetts: Blackwell Publishing.

Khan, S. and A. Lewbel. 2007. "Weighted and Two Stage Least Squares Estimation of Semiparametric Truncated Regression Models." *Econometric Theory,* 23(2):309-47.

Kosmidou, K. 2008. The determinants of banks' profi ts in Greece during the period of EU financial integration, Managerial Finance 34(3):146–159.

Kosmidou, K.; Pasiouras, F.; Tsaklanganos, A. 2007. Domestic and multinational determinants of foreign bank profi ts: The Case of Greek Banks operating abroad, Journal of Multinational Financial Management 17(1): 1–15.

Mansur, A. H. 2015. Financial market developments and challenges in Bangladesh. Policy Research Institute of Bangladesh. Prepared as a Background paper for the Seventh Five Year Plan. Planning Commission. Ministry of Planning. Dhaka.

Miller, S. M.; Noulas, A. 1997. Portfolio mix and large bank profi tability in the USA, Applied Economics 29(4): 505–512.

Molyneux, P. and Thornton, J. 1992. Determinants of European Bank Profitability: A Note, Journal of Banking and Finance 16(6): 1173–1178.

Molyneux, P. 1993. Structure and Performance in European Banking. Mimeo University of Wales Bangor.

Neely, M.; Wheelock, D. 1997. Why does bank performance vary across states? Federal Reserve Bank of St. Louis Review, 27–38.

Pasiouras, F.; Kosmidou, K. 2007. Factors infl uencing the profi tability of domestic and foreign commercial banks in the European Union, Research in International Business and Finance 21(2):222-237

Rahman, M. M., M. K. Hamid & M. A. M.Khan. 2015. Determinants of Bank Profitability: Empirical Evidence from Bangladesh. International Journal of Business and Management; 10(8):135-150;

Ramlall, I. (2009). Bank-Specific, Industry-Specific and Macroeconomic Determinants of Profitability in Taiwanese Banking System: Under Panel Data Estimation. International Research Journal of Finance and Economics, 34, 160-167.

Samad, A. 2015. Determinants Bank Profitability: Empirical Evidence from Bangladesh Commercial Banks. International Journal of Financial Research 6(3):173-179.

Sayeed, M.A., P. Edirisuriya and M. Hoque. 2012. Bank Profitability: The Case of Bangladesh. International Review of Business Research Papers Vol. 8(4):.157 – 176

Stiroh, K. J.; Rumble, A. 2006. The dark side of diversifi cation:The Case of US Financial Holding Companies, Journal of Banking and Finance 30(8): 2131–2161.

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

Sufian, F. and F. Kamaruddin. 2012. Bank Specific and Macroeconomic Determinants of Profitability of Bangladesh's Commercial Banks.The Bangladesh Development Studies 35(4):1-28.

Uddin, S. M. S., & Suzuki, Y. (2011). Financial Reform, Ownership and Performance in Banking Industry: The Case of Bangladesh. International Journal of Business and Management, 6(7),

White, H. J. 1980. A heteroscedasticity-consistent covariance matrix estimator and a direct test for heteroscedasticity, Econometrica 48(4):817-838

WB. 2006. Financial Performance and Soundness Indicators for the South Asia Region Phase III. Getting Finance in South Asia.An Analysis of the Commercial Banking Sector. World Bank. Washington D.C.

Williams, B. 2003.Domestic and international determinants of bank profits: Foreign banks in Australia, Journal of Banking and Finance 27(6):1185–1210.

Annex 1.

List of Scheduled Banks(Total 57 Banks) as on 31 December 2016.

A. STATE OWNED BANKS:
1. Agrani Bank Limited.
2. Janata Bank Limited.
3. Rupali Bank Limited.
4. Sonali Bank Limited.
5. Bank of Small Industries and Commerce Bangladesh Ltd.
6. Bangladesh Development Bank Limited.

B. SPECIALSED BANKS:
1. Bangladesh Krishi Bank.
2. Rajshahi Krishi Unnayan Bank.

C. PRIVATE BANKS:
a) Foreign Banks:
1. Standard Chartered Bank
2. State Bank of India
3. Habib Bank Ltd.
4. Citi Bank, N.A.
5. Commercial Bank of Ceylon Ltd.
6. National Bank of Pakistan
7. Woori Bank
8. The Hong Kong & Shanghai Banking Corporation Ltd.
9. Bank Al-Falah Ltd.

b) Private Banks (Incorporated in Bangladesh excluding Islamic Banks):

1. AB Bank Ltd.
2. National Bank Ltd.
3. The City Bank Ltd.
4. International Finance Investment and Commerce Bank Ltd.
5. United Commercial Bank Ltd.
6. Pubali Bank Ltd.
7. Uttara Bank Ltd.
8. Eastern Bank Ltd.
9. National Credit and Commerce Bank Ltd.
10. Prime Bank Ltd.
11. Southeast Bank Ltd.
12. Dhaka Bank Ltd.
13. Dutch Bangla Bank Ltd.
14. Mercantile Bank Ltd.
15. Standard Bank Ltd.
16. One Bank Ltd.
17. Bangladesh Commerce Bank Ltd.
18. Mutual Trust Bank Ltd.
19. Premier Bank Ltd.
20. Bank Asia Ltd.

21. Trust Bank Ltd.
22. Jamuna Bank Ltd.
23. BRAC Bank Ltd.
24. NRB Commercial Bank Ltd.
25. South Bangla Agriculture and Commerce Bank Ltd.
26. Meghna Bank Ltd.
27. Midland Bank Ltd.
28. The Farmers Bank Ltd.
29. NRB Bank Ltd.
30. Modhumoti Bank Ltd.
31. NRB Global Bank Ltd.

c) Islamic Banks
1. Islami Bank Bangladesh Ltd.
2. ICB Islamic Bank Ltd.
3. Al-Arafah Islami Bank Ltd.
4. Social Islami Bank Ltd.
5. EXIM Bank Ltd.
6. First Security Islami Bank Ltd.
7. Shahjalal Islami Bank Ltd.
8. Union Bank Ltd

The following 9 banks in the private sector which started their operations in FY 2013 were not covered in the present study as their data for the years 2010-2013 would be missing.
1. NRB Commercial Bank Ltd.
2. South Bangla Agriculture and Commerce Bank Ltd.
3. Meghna Bank Ltd.
4. Midland Bank Ltd.
5. The Farmers Bank Ltd.
6. NRB Bank Ltd.
7. Modhumoti Bank Ltd.
8. NRB Global Bank Ltd.
9. Union Bank Ltd
   Shimanto Bank Ltd(57th Bank. Listed as scheduled Bank on July 21, 2016.)

Source: Bangladesh Bank. Scheduled Bank Statistics. October 2016. and Website WWW.bb.org.bd