DETERMINANTS OF BANK PROFITABILITY: A STUDY ON THE BANKING SECTOR OF BANGLADESH

Md Saimum Hossain*
Faruque Ahamed**

Abstract

This paper investigates the impact of bank-specific variables on bank profitability in Bangladesh from 2012-2016. For this purpose, top 15 conventional private commercial banks are selected based on the asset size. The empirical data for these banks are collected from the Annual Reports from 2012 to 2016. The fixed effect model has been used to run the regression analysis among the variables. In case of ROA, two earnings variables (TIN and NII), asset quality (NPL), management efficiency (OPEX), capital strength (CAP), industry impact (SIZE), and asset structure (DPST) have been found to be significant. For ROE, the earnings indicators, capital strength, and industry impact have positive relationship with ROE. Only NPL had a negative relationship with ROE among the statistically significant predicting variables. For NIM, TIN, OPEX, and CAP have a positive relationship whereas NII has negative relationship. The findings of this study can help the banks' investors, policymakers, management and other stakeholders for decision making and improving the performance of financial institutions in the future.

Keywords: Bank profitability, Bangladesh banking sector, Fixed Effect Model

INTRODUCTION

Bank profitability has been a topic of much scrutiny all around the globe for decades. This is even more relevant in the aftermath of the global financial meltdown in 2008 and the introduction of risk-based capital allocation standards like the Basel Framework. Bangladesh, a predominantly bank-based economy, is not out of this global trend of scrutinizing what factors drive banks' profitability on a firm- and macro-level. With increased competition from a number of new entrants, both the incumbent and the new banks in Bangladesh certainly need academic studies that point out the key drivers of banking profitability. Although a number of studies looked into the determinants of profitability for the Bangladeshi banking sector in the past, lion's share of them was carried out during a high-interest rate regime when

*Md Saimum Hossain is a Lecturer in the Department of Finance, FBS, University of Dhaka
**Faruque Ahamed is an Assistant Director in the Financial Stability Department, Bangladesh Bank

the supply of loanable funds in the Bangladesh economy was lower than the demand for them. With a downward sloping yield curve and a prolonged (and significant level of) excess liquidity prevailing across the economy, the researchers believe that there has been a regime change among the source variables of bank profitability and thus a need for a study that scientifically takes on this issue under the changed circumstances.

Bangladesh nationalized all the banks after the liberation war. From 1981 private commercial banks are patronized. Currently 8 State Owned Banks (6 Scheduled and 2 Specialized), 9 Foreign Banks, 40 Private Commercial Banks among which 8 are Shariah-based Islamic Banks, 3 NRB Banks and 29 conventional banks.[1]

Generally bank profitability is affected by both bank-specific and macroeconomic factors. This study examines the bank-specific determinants which affect the profitability of the banking sector. These bank-specific factors are the outcomes of prudent management policy decisions and workforce efficiency. Therefore, the researchers believe that the findings of the study will be helpful for concerned stakeholders such as regulators, policy makers, investors, and to the bank management itself.

LITERATURE REVIEW

Studies looking at both bank-specific and macroeconomic factors are widespread for different economies in the world. For bank-specific factors which have high influence on the profitability of banks, studies were conducted by Bhatia, Mahajan & Chander (2012) and Sufian & Noor (2012) in India; Liu & Wilson (2010) in Japan; Shoaib, Wang, Jaleel & Peng (2015) in Pakistan; Sufian & Chong (2008) in Philippines; Macit (2012), Alper and Anbar (2011), Alp, Ban, Demirgunes & Kilic (2010) in Turkey; Kosmidou, Tanna, and Pasiouras (2005), Sufian (2011) in Korea, Saeed (2014) in United Kingdom etc.

From the perspective of Bangladesh, Dey (2014), Sufian & Habibullah (2009), Abdullah, Parvez & Ayreen (2014) conducted similar studies.

Sufian (2011) used 251 bank information of Korea from the period of 1992-2003 and found that liquidity had negative and non-interest income has positive relationship with profitability. Goddard, Molyneux & Wilson (2004) conclude that banks which possess higher liquidity witness lower profit.

Macit (2012) conducted a study using quarterly unconsolidated balance sheets of participating banks that operated between 2005 and 2010 in Turkey. Study found

[1]https://bangladesh-bank.org/fnansys/bankfi.php, accessed May 10, 2017

that equity to total asset ratio has positive impact on profitability while the ratio of nonperforming loans to total outstanding loans and advances has negative relationship.

Mauricio Jara-Bertin, Jose Arias Moya, Arturo Rodriguez Perales (2014) found a positive relation between the capital adequacy and profitability by using the panel data of 78 commercial banks from Argentina, Brazil, Chile, Colombia, Mexico, Paraguay, Peru, and Venezuela over the period from 1995 to 2010.

Empirical evidence by Demirguc-Kunt and Huizinga (1999) suggests that banks who preserve higher equity level compare to their assets tend to perform better. This is supported by Ben Naceur and Goaied (2008), Pasiouras and Kosmidou (2006), Garcia-Herrero et al. (2009), Obamuyi (2013) and Dietrich & Wanzenried (2009).

Gul, Irshad, and Zaman (2011) used pooled Ordinary Least Square (POLS) method to identify the relationship between bank specific and macroeconomic characteristics over bank profitability by using data of top 15 Pakistani commercial banks over the period 2005-2009. They identified that assets, loans, equity & deposits have positive impact on all 3 profitability indicators i.e., ROA, ROE and NIM.

Al-Jarrah, Ziadat and El-Rimawi (2010) conducted a study using the cointegration and error correction models to identify the determinants of profitability on all Jordanian's banks over 2000-2006. According to the study loans and advances outstanding to total assets ratio, non interest or operating expenditures ratio, the capital arrangement and the deposit to asset ratio are important internal determinants of profitability.

Shoaib, Wang, Jaleel & Peng (2015) conducted a study through POLS regression model by using the panel data of all scheduled banks of Pakistan from 2006-2013. The empirical results show that profitability of banks adversely affected by liquidity, non-performing loans & administrative expensive and positively affected by capital adequacy.

According to Hassan & Bashir (2003), bank profitability measures respond positively to the increases in capital.

Increase in operating expenses causes the profitability of Turkish banks to fall, commented Alp, Ban, Demirgunes, & Kilic, (2010).They also identified that there does not exist any statistically significant relationship between total loans and receivables to total assets ratio with the indicators of profitability.

Growe, DeBruine, Lee, and Maldonado (2014) conducted study during the period 1994-2011 over U.S. regional banks using the Generalized Method of Moments

(GMM) estimator technique and found that the level of nonperforming assets is negatively related to all measures of profitability.

Acaravci,S. K. and Çalim, A. E. (2013) explained that in case of private commercial banks, the volume of deposits has an insignificant impact on profitability and higher non-performing loans reduces the profitability by large extent whereas capital adequacy has significant and positive impact on profitability.

Kosmidou, Tanna, and Pasiouras (2005) studied UK owned commercial banks during the period 1995-2002 to identify bank-specific characteristics, macroeconomic conditions, and financial market structure on banks' profits and found that capital strength and efficiency in expenses management has a positive and leading influence on their performance.

Kosmidou (2006) and Pasiouras et al. (2006) reveal a negative effect of liquidity on bank profitability. Vieira (2010) found a weak short run positive relationship between ROA and liquidity.

According to Lee and Hsieh (2013) and Menicucci and Paolucci (2016), high volume of deposits lead to higher profits. Similar results were found by Saeed (2014) in his study. However, Demirguç-Kunt and Huizinga1 (1998) found mixed relationship between deposit and profitability.

Saeed (2014) investigates the impact variables of profitability on 73 UK commercial banks from 2006 to 2012 and concluded that capital ratio, loan outstanding, volume of deposit deposits, amount of liquidity, and interest rate have positive impact on ROA and ROE.

Sufian and Chong (2008) examine the performance determinants of banks in Philippines during the period 1990–2005. The study suggest that operating expense is negatively related with ROA and ROE while the capital and non-interest income have positive impact on profitability.

Menicucci, E., and Paolucci, G. (2016) found that higher equity ratio on total assets can be a considerable factor on the profitability of banks in Europe.

Bhatia, Mahajan & Chander (2012) tried to examine the private sector banks profitability determinants from 2006-07 to 2009-10. Backward Stepwise Regression Analysis has been conducted on 23 banks to identify the relationship of these determinants banks performance. The study reveals that loan & advances outstanding to deposit ratio, Capital adequacy ratio and non-interest income has direct impact on Return on Assets.

Another study in Indian banking sector during the period of 2000-2008 by Sufian& Noor (2012) liquidity and operating expenses has significant impact on the profitability.

METHODOLOGY

The methodology of this study centers on a test of panel data. Using the econometric regression model mentioned below, we employ a statistical technique called the Hausman Test to determine the ideal panel data analysis model to use in ultimately analyzing the sample data set. Based on the output of the Hausman Test, we then use the widely used Fixed Effect Model to test the explanatory powers and directions of our selected variables on the profitability indicators.

In this study we modeled the following equation:

$$Y= \alpha + \beta_1X_1+ \beta_2X_2+ \beta_3X_{3+} \beta_4X_{4+} \beta_5X_{5+} \beta_6X_{6+} \beta_7X_{7+} \beta_8X_{8+} \varepsilon$$

Where,Y= Profitability of the Bank

X_1= Total Interest Income

X_2= Non Interest Income

X_3= Non Performing Loans

X_4= Operating Expenditure

X_5= Capital

X_6=Loans and Advances Outstanding

X_7= Asset Size

X_8= Total Deposit

In case of panel data set, usually Pooled Ordinary Least Square (POLS), the fixed effect model, or the random effect model are used. When the number of independent variables is fixed and all the variables are represented in ratios, fixed effect model fits the best in case of regression analysis and Analysis of Variance (Alison, 2005). In our study, since the total number of independent variables is fixed and all of them are expressed as ratios, we choose not to use the POLS model. Rather, the Hausman test is conducted to confirm between the fixed effect model and the random effect model. The equation of the test is as follows:

chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)

As presented in Table 1 below, in the Hausman test, the Null hypothesis is rejected which verify that the fixed effect model should be used for the study.

Table 1

Hausman Test Results

	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
TIN	.1192775	.0305708	.0887066	.0261121
NII	.2150118	.0132405	.2017713	.0508436
NPL	-.1057622	-.0814438	-.0243184	.
OPEX	-.2695138	-.061075	-.2084388	.0846871
CAP	.195298	.0876682	.1076298	.0391191
LTA	-.0074842	.0064389	-.0139231	.0048142
SIZE	.0101024	.0025885	.0075139	.0033473
DPST	-.0382609	-.0185267	-.0197342	.0113948

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 24.25

Prob>chi2 = 0.0021

(V_b-V_B is not positive definite)

Data Set and Empirical Model

The banking industry in Bangladesh is concentrated in the sense that the top 15 banks together comprise more than seventy percent of the asset base of the Private Commercial Banking segment of the banking industry (as of 2016). This humongous concentration of the industrial structure justifies the use of data for top fifteen (based on Asset Size) Conventional Private Commercial Banks as sample for this research. No Shariah-based Islamic bank was included in order to maintain homogeneity of sample. Since the postulation of the research question is based on the downward yield curve and excess liquidity scenario, data for the 2012-2016 period have been collected from the Annual Reports of the respective banks.

Dependent Variables: In alignment with the earlier studies, we have chosen three different measures of profitability as dependent variables. Return on assets (ROA), Return on equity (ROE) and Net interest margin (NIM). Return on Asset (ROA) measures how efficiently a bank utilizes its financial and real asset to generate a specific return. Return on equity (ROE) explains the return against the book value of the shareholders. ROE expresses management efficiency in shareholders fund management. The Net Interest Margin (NIM) variable is defined as the net interest income (calculated by subtracting total interest expense from total interest income) divided by total assets.

Independent Variables: We have taken eight independent variables as potential determinants of conventional commercial banks. All the determinants are bank specific or internal. These explanatory variables work as a proxy of earnings, liquidity, management efficiency, asset quality and capital strength.

Table 2

List of Variables and Proxies

Variables	Measure	Proxy
Dependent Variables		
ROA	Net Profit/Total Asset	Profitability
ROE	Net Profit/Total Equity	
NIM	Net Interest Margin/Total Asset	
Independent Variables		
TIN	Total Interest Income/Total Asset	Earnings
NII	Non-Interest Income/Total Asset	
OPEX	Operating Expense/Total Asset	Management Efficiency
DPST	Total Deposit/Total Asset	Asset Structure
NPL	Non-Performing Loans/Total Loans	Asset Quality
CAP	Total Equity/Total Asset	Capital Strength
SIZE	Natural Logarithm of Total Asset	Industry Impact
LTA	Outstanding Loans/ Total Asset	Liquidity

Total Interest Income (TIN) and Non-Interest Income (NII) have been used as the proxy of earning. Total interest is the revenue generated from the loans and advances outstanding. Non-Interest Income includes Fees and Commission, Investment Income, foreign exchange profit and all other income. Both of these variables have been divided by Total Asset to identify the portion of each income respective to asset.

Operating expense (OPEX) or non-interest expense used in the regression are the measures the efficiency of the management. Total operating expense variable has been divided by Total asset. NPL explains the Non-Performing loans to the outstanding loans and advances. Higher NPL ratio is bad for the banks. These loans do not generate any return and need to keep provision against them.

Equity to assets is used a proxy for capital strength (CAP). Higher equity in terms of asset means the bank is well capitalized. Banks with high capital ratio assumed to have lower risk threat than the banks with low capital ratio. Higher capital also explains that shareholders are more engaged in the operation. High capitalized banks are able to absorb shocks at different levels from various risk factors and perform well in the long run.

Deposit is the major source of fund for the banking business. Higher deposit creates opportunity to disburse more loans and advances. Deposit to asset ratio (DPST) has been used to represent asset structure.

The size variable (SIZE) has been measured by taking the natural log of total assets. Generally large size banks has the possible cost advantages because of economics of scale. In this sense, SIZE variable may have positive effect on the bank profitability.

As a liquidity measure, we use Loans and Advance Outstanding (LTA) are major source of income for the banks. Higher loans and advances allows the banks to generate more cash flow. LTA has been used to measure the level of liquidity for the banks.

It is noteworthy that all the variables are scaled using comprehensive variables like Total Asset or Total Loans to create comparability of data for the sample banks.

RESULTS AND DISCUSSION

The outputs of the three models are mixed. As has already been mentioned, based on the Hausman Test, a Fixed-Effect (FE) model was employed for all the three dependent variables.

ROA as a Measure of Profitability

As can be seen from the Table 3, for Return on Asset (ROA), all of the variables except one were found to be significant at a significance level of 5%. The two earnings variables (TIN and NII), asset quality variable (NPL), management efficiency variable (OPEX), capital strength variable (CAP), industry impact variable (SIZE), and asset structure variable (DPST) have been found to be significant in explaining the variation in the Return on Asset of the banks. However, the liquidity variable (LTA) was found to be statistically insignificant for the dependent variable. An F-value less than 0.05 indicates the validity of the model.

As can be hypothesized from general economic theory, of the statistically significant predictor variables, the earnings variables, the management efficiency proxy, the capital strength indicator, and the industry impact variables had a positive relationship with the dependent variable. On the other hand, asset quality and asset structure had a negative impact on ROA.

Table 3

Fixed Effect Model Output for ROA as a Measure of Profitability

```
Fixed-effects (within) regression               Number of obs      =        75
Group variable: Bank1                           Number of groups   =        15
R-sq:  within  = 0.4861                         Obs per group: min =         5
       between = 0.1335                                        avg =       5.0
       overall = 0.1454                                        max =         5
       F(8,52)                                                 =      6.15
corr(u_i, Xb)  = -0.8912                        Prob> F         =    0.0000

------------------------------------------------------------------------------
         ROA |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         TIN |   .1192775   .0514262     2.32   0.024     .0160832    .2224717
         NII |   .2150118   .0930546     2.31   0.025     .0282842    .4017395
         NPL |  -.1057622    .036071    -2.93   0.005    -.1781439   -.0333805
        OPEX |  -.2695138   .1235789    -2.18   0.034     -.517493   -.0215345
         CAP |    .195298   .0547341     3.57   0.001     .0854661     .30513
         LTA |  -.0074842   .0128252    -0.58   0.562     -.03322    .0182515
        SIZE |   .0101024   .0042171     2.40   0.020     .0016402    .0185645
        DPST |  -.0382609   .0182258    -2.10   0.041    -.0748335   -.0016882
       _cons |  -.0764945   .0523878    -1.46   0.150    -.1816183    .0286294
-------------+----------------------------------------------------------------
                     sigma_u |  .00634327
                     sigma_e |  .00272912
         rho |  .8438071   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(14, 52) =     4.64                 Prob> F = 0.0000
```

ROE as a Measure of Profitability

When we run the model for Return on Equity (ROE), all the variables except the proxies for management efficiency (OPEX), liquidity (LTA), and asset structure (DPST) have been found to be statistically significant for determining the ROE. Again, the F-value is substantially less than 0.05, rendering our model to be acceptable. (Table 4 below hosts the results.)

Like that of the case of ROA, the earnings indicators, capital strength, and industry impact have positive relationship with ROE. On the other hand, only NPL had a negative relationship with ROE among the statistically significant predicting variables.

Table 4

Fixed Effect Model Output for ROE as a Measure of Profitability

```
Fixed-effects (within) regression          Number of obs      =        75
Group variable: Bank1                      Number of groups   =        15
R-sq:  within  = 0.4688                    Obs per group: min =         5
       between = 0.1939                                   avg =       5.0
       overall = 0.0009                                   max =         5
                                   F(8,52)           =      5.74
corr(u_i, Xb)  = -0.8932                   Prob> F           =    0.0000
------------------------------------------------------------------------------
         ROE |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         TIN |     1.45564   .5716305     2.55   0.014     .3085796    2.602701
         NII |    2.578287   1.034352     2.49   0.016     .5027077    4.653867
         NPL |   -1.389079   .4009486    -3.46   0.001    -2.193641   -.5845164
        OPEX |   -2.005121   1.373647    -1.46   0.150    -4.761545    .7513041
         CAP |     1.30065   .6083988     2.14   0.037     .0798081    2.521491
         LTA |   -.0587024   .1425596    -0.41   0.682    -.3447691    .2273643
        SIZE |    .1349843    .046875     2.88   0.006     .0409226    .2290459
        DPST |   -.3453744   .2025893    -1.70   0.094    -.7518997    .0611508
       _cons |   -1.102191   .5823191    -1.89   0.064     -2.2707    .0663173
-------------+----------------------------------------------------------------
                     sigma_u |  .07755515
                     sigma_e |  .03033563
                         rho |  .86730443   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(14, 52) =     5.18                 Prob> F = 0.0000
```

NIM as a Measure of Profitability

The final measure of bank profitability, as proxied by Net Interest Margin (NIM), is found to be determined by statistically significant variables like earnings indicators (TIN and NII), management efficiency indicator (OPEX), capital strength indicator (CAP) etc. at a 5% significance level. Other variables like the NPL, LTA, SIZE, and DPST were not very important statistically to explain NIM's variability. The overall model has validity with an F-value less than the assumed significance level of 5% as showcased by Table 5.

Table 5

Fixed Effect Model Output for NIM as a Measure of Profitability

```
Fixed-effects (within) regression               Number of obs      =        75
Group variable: Bank1                           Number of groups   =        15
R-sq:  within  = 0.6466                         Obs per group: min =         5
       between = 0.1990                                        avg =       5.0
       overall = 0.3021                                        max =         5
F(8,52)             =     11.89
corr(u_i, Xb)  = -0.0369                        Prob > F           =    0.0000

------------------------------------------------------------------------------
         NIM |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         TIN |   .2631363   .0614186     4.28   0.000     .1398908    .3863817
         NII |  -.5975427   .1111356    -5.38   0.000    -.8205525   -.3745329
         NPL |  -.0392798   .0430798    -0.91   0.366    -.1257257    .0471661
        OPEX |    .343399    .147591     2.33   0.024      .047236    .6395619
         CAP |   .1522174   .0653692     2.33   0.024     .0210445    .2833902
         LTA |   .0093484   .0153173     0.61   0.544    -.0213879    .0400848
        SIZE |   .0074703   .0050365     1.48   0.144    -.0026361    .0175767
        DPST |  -.0266443   .0217671    -1.22   0.226    -.0703232    .0170346
       _cons |  -.0588254    .062567    -0.94   0.351    -.1843754    .0667245
-------------+----------------------------------------------------------------
     sigma_u |  .00770781
     sigma_e |   .0032594
         rho |  .84830659   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(14, 52) =     7.49                 Prob > F = 0.0000
```

As far as the directions of the variables go, one of the earnings indicators (TIN), the management efficiency proxy (OPEX) and the capital strength proxy (CAP) have been found to have a positive relationship. However, unlike the previous models, one earnings indicator (NII) has been found to be negatively related with NIM. This is in alignment with the theory as this variable is called the Non-Interest Income (NII) ratio. Therefore it is quite expected that this variable would have a negative relationship with Net Interest Margin ratio.

CONCLUSIONS

This study concludes that several bank-specific factors possess some heavy influences on the profitability of the banks in Bangladesh. Variables like total interest income, non-interest income, capital, loans & advances, operating expenditure, deposit, size and non-performing loans have some significant impact on the profitability. Although the impact of variables is mixed in the different measures of profitability, the results express that all the factors are relevant. Even though there are only few studies over the developing countries banking system, findings of this study is very much similar to the previous studies.

Although the general conclusions of this study (in terms of both significance of the predictor variables and the directional relationship) concur in general with the other studies, there are small differences. It is interesting to see that in the context of Bangladesh, none of the three profitability proxies was affected by the liquidity variable which contradicts findings from some of the previous studies done in other countries. This potentially indicates a weak planning framework for maintaining a target CASA (current account/savings account) ratio to maximize bank profitability. Another implication is that banks do not make planned loan disbursement and have minimal focus towards maximizing return through Balance Sheet management strategies.

The results demonstrated that the study is very much policy relevant and long term adjustment is needed in the variables to improve the profitability. The study also revealed that banks have heavy dependence on the non interest income to improve their profitability. The coordination among the policy makers, management and relevant stakeholders can improve the banks efficiency and profitability which ensure sustainable growth of our financial system and maximize shareholder wealth.

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APPENDIX

Table I

Bank Name/Year	Asset Size in BDT Crore as of 2016	Size as a % of PCB* Sector Size
AB BANK LTD.	31483.89	5.82%
BANK ASIA LTD.	25319.57	4.68%
BRAC BANK LTD.	24860.50	4.60%
DHAKA BANK LTD.	20219.16	3.74%
DUTCH-BANGLA BANK LTD	27684.44	5.12%
EASTERN BANK LTD.	21118.50	3.91%
MERCANTILE BANK LTD.	20412.75	3.78%
NATIONAL BANK LTD.	30561.68	5.65%
ONE BANK LTD.	18824.10	3.48%
PRIME BANK LTD.	25659.90	4.75%
PUBALI BANK LTD.	32036.19	5.92%
SOUTHEAST BANK LTD.	29179.80	5.40%
THE CITY BANK LTD.	25942.39	4.80%
TRUST BANK LTD.	21024.15	3.89%
UNITED COMMERCIAL BANK LTD.	32972.08	6.10%
Total	**389,315.10**	**72.00%**
Sector Total, PCBs	**540,695.67**	

*****_Private Conventional Commercial Banks (PCBs)_

Source: Annual Reports of the Sample Banks, Author Calculations