

# EXPLORING THE DETERMINANTS OF PROFITABILITY IN BANGLADESH'S BANKING SECTOR: A COMPREHENSIVE ANALYSIS OF MARKET STRUCTURE, LIQUIDITY, AND MACROECONOMIC FACTORS

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## Abstract

Bank business in Bangladesh has experienced unique deviations over the last twenty years by adopting enough steadiness, liberalization and deregulation program. This study notifies the influence of rivalry, liquidity position and macroeconomic issues on the profitability of commercial banks in Bangladesh. The exploration process considers the impact of bank-specific, industry-specific and macroeconomic factors. Bank-level secondary data were obtained from the annual reports of 57 commercial banks in Bangladesh from 2007 to 2017. Driscoll and Kraay standard error is used to analyze the data. In our study, commercial banks' profitability in Bangladesh is mostly influenced by firm-specific variables like expense management, employee productivity, liquidity position, bank size, and marginal cost. Industry rivalry determined by Herfindahl-Hirschman Index has a positive but insignificant influence on bank profitability aligned to the Structure Conduct Performance Hypothesis. Among macroeconomic variables, profitability of banks has a strong positive relationship with bank spread and GDP growth rate. The rate of inflation has a strong negative and statistically significant impact on bank profitability. This research study articulates some significant policy implications for quickening the profitability in the banking industry of Bangladesh.

**Keywords:** Bank Profitability, Marginal Cost, Structure Conduct Performance (SCP), Expense Management, Market Concentration.

**JEL Classification:** G21, C23, G14, D4.

## INTRODUCTION

Banks are the potential scope for mobilizing financial resources to promote economic growth. These are profit oriented service industry. A comprehensive banking sector contributes to stabilize a financial system which will accomplish earnings for a developing economy. Some commercial banks are renowned for their profitability but some other banks weakened, this concern generates questions regarding some issues which will be subjugated by the bank management to govern their profitability. It is the capability of a business to get profit which is the main objective of all commercial ventures. In bank business, determining present and earlier profitability and predicting upcoming profitability are imperative.

It is important to examine bank characteristics, industry structure and macroeconomic variables in explaining the profitability of a bank. To maintain financial stability and to defend any negative shocks, it is badly needed to identify the significant determinants which have mostly influence on bank profitability. Again bank's agricultural credit for pesticides, and to enhance crop productivity have long-run influence on a countries' agricultural GDP (Patwary et al., 2023). In 1971, only four domestic national banks: Sonali Bank, Agrani Bank, Rupali Bank, and Janata Bank were there in Bangladesh. Only three foreign banks and no private banks were there at that time (Alam and Riyadh, 2003). Liberalization policy was initiated in 1980 and first private commercial bank was started in 1982, named Arab Bangladesh Bank Ltd. At the end of 2017 there were six (6) state owned, thirty nine (39) private commercial banks, three (3) specialized banks, nine (9) foreign banks and five (5) non-schedule banks in Bangladesh (Annual Report of Bangladesh Bank, 2017-18). Bangladesh Bank is the supervisory authority to oversee the activities of scheduled banks and financial institutions in Bangladesh. According to Mujeri & Younus (2009) 96% of total assets of the monetary sector are accounted in Bangladesh banking arena.

Empirical literatures provide two constructing hypotheses relating to market structure & efficiency to determine profitability of the banks which is directly related with Structure Conduct Performance (SCP) hypothesis and Efficient Structure Hypothesis (ESH). In traditional SCP supposition, the competitive behavior of market structure affects bank profitability. In highly concentrated markets banks act less competitively and apprehend additional profit (Bain, 1951). On the other hand, ESH advocates that bank profitability is derived from the degree of efficiency rather than concentration (Demsetz, 1973). So, it is required to investigate market rivalry and concentration along with liquidity position which persists in commercial banks in Bangladesh and its consequence on profitability.

The present study is a modest attempt to explore the effect of market structure regarding rivalry and concentration on the profitability of 57 commercial banks after governing the influences of some bank-specific and macro-economic issues. The specific objective of the study is to explore the status of competition and concentration in the banking arena in Bangladesh, to access the influence of liquidity position as well as macroeconomic potency on commercial bank's profitability in Bangladesh.

## **REVIEW OF LITERATURE**

Aligning with the objectives of the study, some existing literatures have been reviewed to identify the study variables. The term 'rivalry in the market' is originated in the book of 'wealth of Nation' (Smith, 1776) in which rivalry is not defined as the state or condition but the contest among the competitors to achieve the market share. However, this conception is confronted by the Australian school as an ongoing active competitive process (Leon, 2014), where continuously generating and adopting new products and procedures to deal with competition. Stigler (1957) defines as 'rivalry among individuals (or group or states)', and it arises when two or more parties attempt for something that all cannot get. This rival condition occurs by providing benefits to customers through lowering prices, increasing quality and accelerating innovation for which firm level of efficiency will be improved.

In a free economy, market structure outlines the patterns of market. Some types of market structures are monopoly, oligopoly, monopolistic competition and perfect competition (Smith, 1776). In monopolistic competition, many producers sell products or services that are not perfectly substitutes. In oligopoly, an insignificant number of companies together regulate the mainstream of market segment. In monopoly, only one service provider exists. And in perfect rivalry, identical products are traded among limitless number of manufacturers and customers with an elastic demand curve. In relative-market power (RMP) hypothesis, companies which have huge market shares control the price of their products and attain competitive earnings (Berger, 1995). The term 'market concentration' is used when top companies comprise huge fraction of the entire market. If the top companies retain more market share, the industry is said to be highly concentrated and if the concentration is low the industry is said to be highly competitive. High concentration indicates non-rivalry and hence inefficient market. In case of potentiality, high concentration affects both 'behavior' and 'profitability' of a bank.

Pawłowska (2016) measures rivalry competition amongst banks based on structural and non-structural method. Structural approach comprises of Structure-Conduct-Performance model (SCP) developed by Bain (1951) and the Efficient Structure Hypothesis (ESH) developed by Demsetz (1973). ESH in the banking literature reveals that higher efficiency enhances higher profitability i.e more competent banks have lower costs and gather larger market share (Demsetz, 1973; Pelzman, 1977).

The non- structural approach comprised of either total industry data or discrete firm data which cannot be considered to measure the level of concentration. It can be assumed here that the competition depends on other market features like hindrances to entry and exit. In SCP model, when market is more concentrated, there exists less rivalry which leads to higher profitability. In ESH, highly effective firms (banks) are operated in concentrated market. Hicks (1935) established a concept which contradicts to the ESH, and termed as Quiet Life (QL) theory. In this theory, greater market strength banks get privileged position and undergo lower cost efficiency because of quiet life of their managers. Bikker & Leuvensteijn (2014) stated that, in QL hypothesis, efficiency can be attained through monopolistic pressure. Smirlock (1985) opposed to the relationship between concentration and profitability, and experienced a Relative Market Power (RMP) hypothesis which established a relation between bank market segment and profitability. Mirzaei et al. (2013) also supported this relationship. Hahn (2008) tested the hypothesis of SCP, RMP and ESH in Austrian banks and found supporting evidences on SCP hypothesis and recommends that extra profits are negligible. Yu & Neus (2005) studied on German banking sector which supports both the ESH and SCP hypotheses. Demirguc-Kunt & Huizinga (1999), Goddard et al. (2001) confirmed an optimistic association between concentration and profitability and emphasized on traditional SCP hypothesis. Claessens & Laeven (2004) stressed that concentration boost up competition. In a progressive economy, concentrated banking system enhanced by competitive operation. Mosharrafa & Islam (2021) performed a study by considering three banks concentration ratio on 57 commercial banks in Bangladesh. They showed that concentration ratio is significantly related with the profitability of banks measured by ROE and ROA.

After studying a sample of 23 industrialized countries Bikker & Haaf (2002) exhibited the existence of negative relationship among the grade of concentration and the degree of competition. In this study the researchers used H-statistic to analyze the variety of concentration indices. Conflicting with these outcomes, Angelini & Cetorelli (2003), revealed a favorable relationship by means of the Lerner index and the Herfindahl–Hirschman index (HHI) in the analysis of Italian banking sector. During the period of 1992-2004, restructuring and consolidation among Korean commercial banks decreased competition and increased concentration but for the growing concern, improved concentration did not lessen competition (Park, 2009). To accept or reject between SCP and RMP hypothesis, Molyneux & Forbes (1995) examined a set of European countries and found insignificant values of concentration index for RMP, thus, rejecting the RMP and accepting the SCP theory. However as stated by Berger et al. (1998), best accomplished banks are situated in vastly concentrated markets. Again, a brief study on the Indian banking arena throughout the period of 2000-2008 concluded that liquidity and operating expenses have significant impact on bank profitability (Sufian & Noor, 2012).

A study of 69 countries was conducted by Beck et al. (2006) focusing that cross –country analysis indicated an optimistic association between rivalry and constancy in the banking system which will enhance profitability in the long run. Opposing to this view, greater bank competition results in financial instability by decreasing market power, which consequently reduces profits and assets value, supporting the competition fragility (Marcus, 1984; Keely, 1990; Carletti & Hartmaan, 2002). Staikouras & Koutsomanoli-Fillipaki (2006) exhibited that an efficient bank can maximizing profit in two ways: either by maintaining present prices and company size or by dropping charges and increasing the extent of the company. If the bank selects the second option, it will gain market share without reducing the competitiveness. Typically, competition exists in developed economy but dubiously progress at the similar rate in flimsy economy as examined by Delis (2012) using the Boone indicator for 84 banking systems in the globe. The introducer of Boone indicator, Boone (2008) measured the effect of performance efficacy in terms of profits or market-share. The basic notion of this indicator is that efficient banks could improve their performance through competition and reducing marginal cost.

In Bangladesh, a study has been done by Uddin & Gupta (2012) and found that market was highly concentrated in 1997. After that there has been a substantial reduction in concentration and market is highly rival till 2010. Another study was performed by Ahamed (2012) for the period of 1999-2011 by means of random effects (RE) estimator found that profitability in the banking area in Bangladesh is measured by concentration not by the market share of banks. He showed that concentration drops the cost of collusion between banks and generates greater profit for all market participants.

## **METHODOLOGY**

This study is based on secondary data set due to the pattern of the research. It accomplished a panel regression model which considered cross-sectional data set to comprehend the relationship among market rivalry, liquidity position and profitability of the commercial banks in Bangladesh for the period of 2007- 2017. Consolidated balance-

sheets and income statements published in the annual reports of the individual banks and their websites were used to accumulate the required bank level data set. Macro level data have been collected from Bangladesh Bank and Bangladesh Bureau of Statistics. An unbalanced panel data set is castoff for the study period due to unavailability of data for the years 2007-2009 and 2010. In the context of causal implication Fixed Effect (FE) and random effect (RE) regression model is used (Gangl, 2010). With this vision in mind, the relevant Hausman test has been performed for equation 1 to confirm the evidence supporting the fixed effect modeling<sup>1</sup>. The methodological issues associated with rivalry and profitability is addressed below.

The bank level data have been acquired from the annual reports of diverse banks in Bangladesh. We have been collected macro level data from Bangladesh Bank and Bangladesh Bureau of Statistics. The model of our study has been assessed by using the STATA econometric software.

### Empirical Design: An Analytical Framework

The study considered bank level annual data from 57 commercial banks operating in Bangladesh from the time span of 2007 to 2017. In this study, a panel regression is estimated having measure of profitability by ROA and exercise its competitive power or the degree of concentration, if any as well as the impact of liquidity position and macroeconomic issues on it. Thus, ROA has been considered as dependent variable along with the group of bank definite variables, industry specific variables and macroeconomic indicators as independent variables.

### Model Specification

The econometric proposition to assess the model will be as in the subsequent linear form:

$$ROA_{it} = a_0 + \sum_{j=0}^j \beta_j X^j_{it} + \sum_{l=0}^l \beta_l X^l_{it} + \sum_{m=0}^m \beta_m X^m_{it} + v_{it} + \mu_{it} \dots \text{Equation-1}$$

where ROA is the return on asset of bank i at time t; where i = 1,2,3...N; t=1,2,3...T.  $\alpha$  is a constant term. The superscripts j, l and m of  $X_{it}$  signify the descriptive variables, bring together into bank specific, industry specific and macroeconomic contributing factors respectively.  $v_{it}$  and  $\mu_{it}$  are the unnoticed bank specific effect and the idiosyncratic error.

### Description of the Bank Profitability Determinants

We established the above econometric model to assess the impact of market rivalry, liquidity impact and macroeconomic issues on the profitability of banks by using i) bank-specific variables, ii) industry-specific variables and iii) macroeconomic variables (presented in Table 1).

**Table 1: Explanation of the variables considered in the study of market rivalry, liquidity and macroeconomic factor’s impact on bank profitability**

Variables	Description	Expected Effect
<b>Dependent variable: Return on Asset (ROA)</b>	Net profit to total assets ratio	N/A
<b>Explanatory Variables</b>		
<i>Bank Specific Variables</i>		
i) Expense management	Operating expenses to total assets ratio	+
v) Employee productivity	Net profit to no. of employees	+
vi) Liquidity position	Liquid assets to total assets ratio	+
viii) Bank Size (ln (TA))	Natural logarithm of total asset of a bank	+/-
ix) Net non-interest income ratio	Non-interest revenue less non-interest expense over total assets	+
x) Marginal cost	Ratio of percentage change in deposit over percentage change in interest	-
<i>Industry- Specific Variables</i>		
xi) Hirschman-Herfindahl Index (HHI)	Sum of square of market share is a proxy for market structure variable	+/-
<i>Macroeconomic-specific variables</i>		
xii) Bank spread	Difference between average lending rate and deposit rate of banks	+
xiii) Rate of inflation	Annual rate of inflation (%)	+
xiv) Growth rate of GDP	Real economic growth rate as a % change in GDP	-

### Dependent Variable

Usually ROE, ROA and NIM are used to measure the profitability of a financial institution like bank. We prefer to use Return on asset (ROA) as the profitability indicator of banks in Bangladesh. This is because; Return on Equity (ROE) helps investors or equity holder to assess the capacity of generating income. Net Interest Margin (NIM) only considers net interest income over total asset. It does not measure total profitability of the bank by considering fees and other non-interest income. Conversely ROA reflects what the actual conditions are for generating profit based on the amount of assets they have i.e. converting assets into net capital. ROA also indicates the amount of money earned per dollar of assets. As our study is concerned with the profitability of banks which eventually depends on market rivalry, asset management and operating activities of the banks, we prefer to use ROA as a measure of profitability. We have given our effort to identify the significant impact of bank-specific, industry-specific and macroeconomic variables on this profitability indicator.

### The Explanatory Variables

#### a) Bank- specific variables

##### i) Expense management:

Operating expenses over total cost represent the expense management of an organization. Usually, Operating expenses are characterized by overhead, administrative and maintenance costs. Proper management of these costs upholds

efficacy of the bank and increase competitiveness. Predominantly, for one unit rise in operating expense will be compensated by perusing additional earnings on regular profit margin. Thus, a positive sign has been predicted.

**ii) Employee productivity:**

Employee productivity is measured by the ratio of net profit over the number of employees. Bank could earn more profit if the employees are well managed and utilized properly. In our study we assume positive relationship between employee productivity and bank profitability.

**iii) Liquidity position:**

Liquid asset over total asset ratio represents the capacity of an organization to mitigate its debt and short-term liabilities. Sophisticated liquidity position lessens liquidity risk and the bank can avail profitable investment opportunity by providing loan instantaneously. Thus, we anticipate positive relationship between liquidity and profitability.

**iv) Bank size:**

Both economies and diseconomies of scale are captured by this variable. We measured bank size by taking the natural logarithm of total asset. Due to economies of scale, increasing bank size is positively linked with the profitability but for administrative impediment, large banks might be unable to earn substantial profit. Therefore, we cannot predict the impact of bank size on bank profitability.

**v) Net non-interest income ratio:**

In our study, non-interest income includes various service charges, earning from leasing properties, penalty charges, capital gain from selling assets etc. Again, non-interest expenses include various types of overhead costs and operating costs. We calculate this ratio as net non-interest income (non-interest expense less non-interest revenue) over total assets based on studying diverse literatures. We predict that net non-interest income will affect positively on bank profitability.

**vi) Marginal Cost:**

Ratio of percentage change in deposit over percentage change in interest is used to calculate marginal cost of the bank. It is treated as a proxy to quantify the management efficiency on bank profitability. Better management can collect low interest bearing fund which can accelerate profitability of banks. A significant negative relationship is expected.

**b) Industry-specific variable**

**vii) Herfindahl- Hirschman Index (HHI):**

In our study we use Herfindahl-Hirschman Index (HHI) which is considered to be the more precise measure of concentration and competition as it takes into account all the companies in an industry. This index is commonly used in different empirical literatures (Gelos & Roldos, 2004; Uddin & Suzuki, 2014; Tan, 2016; Maji & Hazarika,

2018; Islam & Nishiyama, 2018). Some of which found positive and some of which found negative relationship between market concentration and profitability. HHI has been calculated as the sum of squares of individual bank asset's shares in the total banking sector assets in Bangladesh. The higher the value of HHI, the larger is the market concentration or low level of competition and vice versa. As we experienced both positive and negative association between concentration and bank profitability in diverse literature, we can't predict its impact in our study.

### **c) Macroeconomic variables**

#### **viii) Bank spread:**

The positive variation between interest charged against deposits and interest received on its lending accomplishments labeled as interest rate spread which controls banks' earning. For the execution of loan, supplementary demand as well as better service triggered up interest rate for lending. This will eventually upturns bank spread. Therefore, we assume positive link between bank spread and profitability.

#### **ix) Rate of inflation:**

Inflation diminishes purchasing power of the money that persuades demand for money. As a result, banks can rise their interest margin by regulating their interest rate to neutralize the inflation premium. So, the hypothesis is, banks' profit is positively connected with the inflation rate.

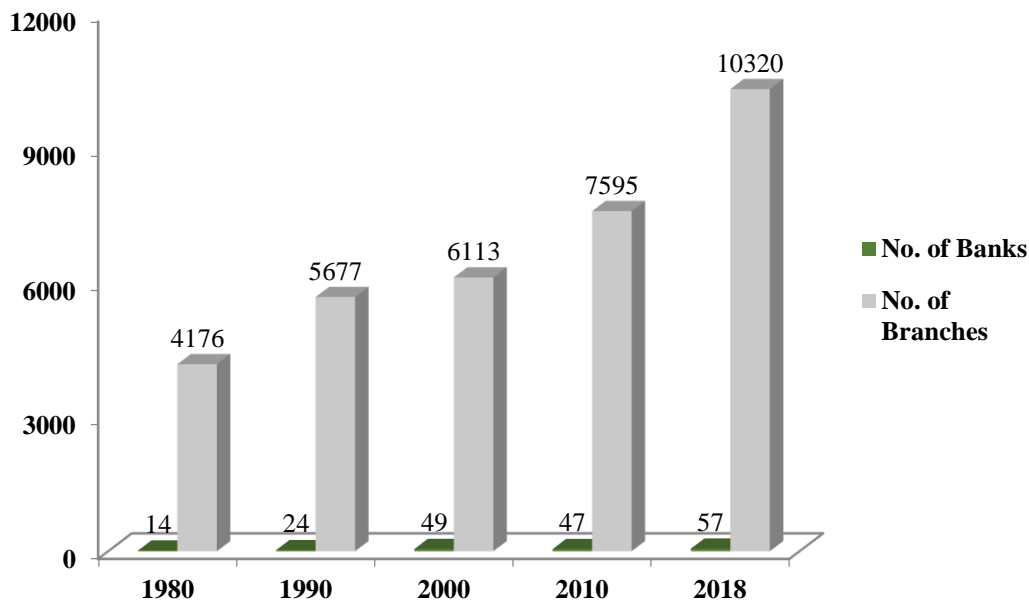
#### **x) Growth rate of GDP:**

We measure economic growth rate through Gross domestic product (GDP) growth rate. Sound GDP growth makes sure that the economy is stable and as an entity of an economy bank reduces its' business risk which produce green pastures for the banks in case of financing. Based on this risk-return tradeoff we expect inverse relationship between economic growth and bank profitability.

### **Empirical Results and Discussion**

The number of banks and their branches in Bangladesh increased in a progressive manner from 1980. Figure 1 shows the development of bank business in Bangladesh from 1980 to 2018.





**Figure 1: Gradual progress of bank business in Bangladesh from 1980-2018**

Descriptive statistics of the dependent and explanatory variables of the commercial banks of our study have been summarized in Table 2.

**Table 2: Summary statistics of dependent and independent variables of banks in Bangladesh**

Variables	No. of Observation	Mean	Std. Dev	Min	Max
<b>Dependent Variable</b>					
Return on asset (ROA)	531	0.0091	0.0200	-0.1400	0.1260
<b>Explanatory Variables</b>					
<i>Bank specific variables</i>					
Expense management (EXMGT)	521	0.0525	0.0539	-0.2690	1.0720
Employee productivity (EMPP)	450	828788.8	2015121	-7003003	23700000
Liquidity Position (LA/TA)	519	0.1720	0.1900	0.0013	3.0670
Bank Size (BS)	533	25.1700	1.1480	20.9300	27.8500
Net non-interest income ratio (NNIR)	519	0.0027	0.0479	-1.0210	0.1740
Marginal Cost (MC)	473	-8.8060	752.7000	-12.3130	9.9020
<i>Industry- Specific Variables</i>					
Hirschman-Herfindahl Index (HHI)	627	0.0430	0.0067	0.0372	0.0592
<i>Macroeconomic-specific variables</i>					
Bank Spread (SPD)	513	5.0660	0.3210	4.4400	5.5100
Rate of Inflation (INF)	627	7.5280	1.5160	5.8300	10.6200
Growth rate of GDP	627	6.2890	0.5990	5.1000	7.2840

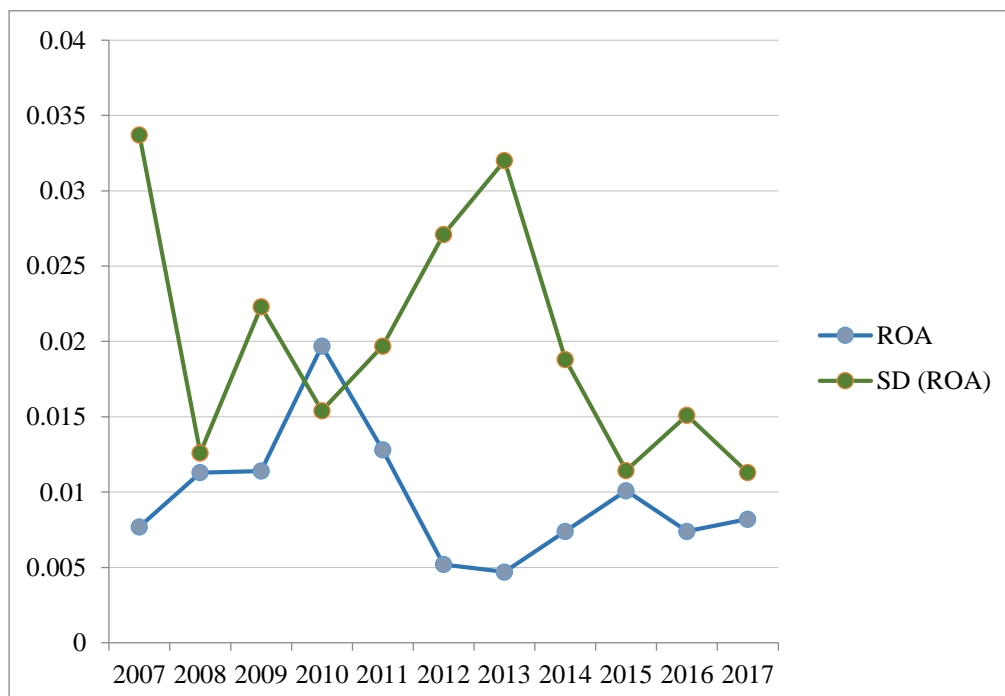
From Table 2, we observe that in Bangladesh, the banks induced average return on assets is 0.91% with a standard deviation of 0.0200. Conversely, the target variable HHI

induced a mean of 4.30%. Theoretically if the HHI index is below 10%, the banking sector is neither extremely competitive nor concentrated which we have found in our study for the banking sector in Bangladesh.

Table 3 illustrates the average and standard deviation (SD) of return on asset (ROA) of banks in Bangladesh in historical manner.

**Table 3: Average and standard deviation of return on asset (ROA) of banks in Bangladesh for a period of 2007-2017**

Year	Mean return on asset (ROA)	Standard deviation (SD) of return on asset (ROA)
2007	0.0079	0.0255
2008	0.0111	0.0126
2009	0.0114	0.0215
2010	0.0166	0.0114
2011	0.0114	0.0188
2012	0.0052	0.0271
2013	0.0047	0.0320
2014	0.0074	0.0188
2015	0.0101	0.0114
2016	0.0074	0.0151
2017	0.0082	0.0113



**Figure 2: Trend of average return on asset (ROA) and its standard deviation (SD) of commercial banks in Bangladesh for period of 2007-2017**

From Figure 2, we see that ROA was the highest in 2010 is around 1.6%. After that it was decreasing and fluctuated up to 2017. Regarding the standard deviation on ROA, we

found that most of the cases are deviated from the mean but it was highly deviated in 2007 and 2013, which means the values are greater degree of extent from the mean during these two periods among the study period from 2007 to 2017.

The regression result of the empirical model in equation-1 about the determinants of ROA of the banks in Bangladesh using the fixed effect model estimator has been presented in Table 4.

**Table 4: Determinants of return on assets (ROA) of banks in Bangladesh, 2007-2017**

Variables	Coefficient	Drisc/Kraay S.E.	t-Statistics	p>t
<b>Dependent Variable:</b> Return on asset (ROA)				
<b>Explanatory Variables:</b>				
<i>Bank Specific</i>				
Expense management	-0.0398*	0.0217	-1.83	0.073
Employee productivity	1.02e-08**	(3.19e-09)	3.19	0.002
Liquidity Position	-0.0106***	(0.00269)	-3.94	0.000
Bank Size	-0.0077**	(0.00235)	-3.29	0.002
Net non-interest income ratio	0.0669	(0.0632)	1.06	0.295
Marginal Cost	-2.2e-07***	(5.98e-08)	-3.68	0.001
<i>Industry- Specific Variables</i>				
Hirschman-Herfindahl Index (HHI)	0.250	(0.249)	1.01	0.319
<i>Macroeconomic-specific variables</i>				
Bank Spread	0.0167***	(0.00406)	4.11	0.000
Rate of Inflation	-0.0033***	(0.000602)	-5.40	0.000
Growth rate of GDP	0.0059***	(0.00144)	4.15	0.000
Number of Observations	356		-----	
Within R <sup>2</sup>	0.5108		-----	
Hausman Test, 0 <sup>2</sup> (P- Value)	51.77		0.0000	
Driscoll and Kraay standard errors test, 0 <sup>2</sup> (P- Value)	153.38		0.0000	

*Note: The above table reveals the regression output from the fixed effect estimation of the determinants of ROA. Coefficients which are significantly diverse from zero at the 1%, 5% and 10% level are marked with \*\*\*, \*\*, \* respectively. Hausman test confirms the justification of using fixed effect estimator. Heteroskedasticity and autocorrelation consistent standard error suggested by Driscoll & Kraay (1998), creates a non-parametric covariance matrix estimator (Driscoll & Kraay standard errors) that are strong to general forms of spatial and temporal reliance.*

We run the model through several time phases to see the impact of financial variables as formed with the classification of bank specific, industry specific and macroeconomic specific variables on bank profitability measured by ROA. The value of R<sup>2</sup> = 0.5108, which indicates that the model estimators depict a good explanatory power of the independent variables.

From the examination of the coefficients of bank specific variables, expense management, employee productivity, and marginal cost were found to be statistically significant at 1% and 5% level of significance. Expense management has significant

negative correlation with profitability which is in line with the study of Kosmidou et al. (2005) in UK banks. In our study 1% increase in expense management leads to reduce 3.98% bank profitability. This negative association suggests that an upturn in operating expense relative to total assets would reduce bank profitability. This consequence is also relevant with expense preference behavior theories of Edwards (1977). Banks should concentrate more on core banking activities to earn interest income by reducing operating expenses.

The efficiency of a worker is usually evaluated in terms of the output of an employee in a specific period of time which is termed as employee productivity. It indicates how much profit is earned by spending on an employee. In our study, there is a positive affiliation between employee productivity and ROA which is also statistically significant. So, it can be suggested that comprehensive training and development programs should be provided to employees with good organizational environment to equip them with the right skills so as to enhance their productivity and subsequently stimulate profitability of the bank.

Our empirical study shows that, bank size is significantly negatively affects profitability of banks at 5% level of significance. It implies that large size of the bank is not providing acceleration of profit which is similar with the study of Kasimodou et al. (2005) among banks in UK. Large banks cannot potentially increase profitability due to the diseconomies of scale. Lower administrative cost and the advantage of efficient management small banks exhibit better performance by providing higher profit.

We experienced an inverse relationship between liquidity and profitability of banks which support the tradeoff theory of liquidity and profitability. Holding more liquidity imposes opportunity cost on the banks. Keeping more liquidity bank has less amounts of money to invest. As a result earning will be reduced as well as profitability will be declined. Our study finding is similar with the study of Abdullah & Jahan (2014).

Distinctive sources of noninterest income comprise of service charges on deposit accounts, securities transactions, trading account and credit fees have positive impact on bank profitability. Its importance is extremely growing which is observed by the study of DeYoung & Rice (2004). They found that 40% of operating revenue in the U.S. commercial banking industry makes up from noninterest income.

We also diagnosed an opposite relationship between marginal cost and profitability which is also highly statistically significant. This means that reducing marginal cost enhance profitability which may also favor the efficiency structure hypothesis (ESH). If a bank has a lower marginal cost, it can have a choice to decrease its price to gain more market shares. To find out the deterministic power of the market structure replacing by the Hirschman-Herfindahl Index (HHI) on bank profitability is found to be positive but statistically insignificant in our study. It means that rivalry or competition in the banking arena in Bangladesh does not have substantial impact to enhance profitability.

Among the macro economic variables, it is observed that bank spread has highly significant positive relationship with ROA. It means that banks charge higher interest on loans and pay less on deposit to induce more bank spread which eventually gear up bank

profitability. From the context of loanable fund theory, this could be interpreted as, the bank spread will be high if demand for loanable funds exceeds supply of loanable funds, i.e. surplus demand of loanable funds influence banks to possess higher lending rate. This implies that with the intention to generate more profit, banks will pursue to enhance net interest margin by increasing interest income (Musah et al., 2018). Again, inflation is negatively and highly significant with ROA i.e. if inflation increase profitability will decrease. This suggests that due to increase in inflation, cost of fund will increase which will ultimately reduce bank profitability. We also found positive and strongly significant correlation of GDP growth rate with the profitability indicator which confirms the positive impact of bank profitability on economic growth at 1% level of significance. It confirms the positive impact of the current level of bank profitability on economic growth. The justification is that buoyancy in economy may extend which might make businesses increase their bank borrowings. Thus, banks may have the scope to acquire more from its lending activities.

## **CONCLUSION AND POLICY IMPLICATION**

This study assessed the impact of bank specific, industry specific and macroeconomic aspects on banking profit in Bangladesh. Some useful visions are provided from this study that determines the profitability of banks.

Our study reveals that the banking industry in Bangladesh is moderately rival and concentrated but insignificant influence on bank profitability. Inter-industry competition together with financial liberty seems to be the key drivers in the enhancement of rivalry in the banking sector. Mostly the bank specific factors i.e., employee productivity have been deemed to be significantly positively associated to banking profits, whereas expense management, liquidity position, bank size and marginal cost have been found significantly negatively affecting bank profitability. Profit variable i.e. ROA responds positively to GDP growth, signifying that banks make more profits during flourishing stages when the country offers better institutional environment. The consequence of inflation has been found to be negative which means that banks are unable to accelerate profit due to incurred higher cost during inflation.

It is also evident that banks may generate higher profit by abusing efficiency of scale, and offering products and amenities at a reduced price with modernized technology in a concentrated market although the number of market players in the bank industry is growing. Rivalry is virtually between aggressive and progressive phenomenon, where progressive is the desirable one. In our study, rivalry is present in terms of technology adoption in core banking operation which is a result of change in market force. For the developing countries like Bangladesh, there is a scope for rising rivalry by averting disproportionate concentration. From a policy perspective, to persist with a specific profit level within the industry, banks need to propose more expanded products and services to achieve competitive advantages. In Bangladesh, banks have been moving towards functioning efficacy by which managerial expertise can be achieved. Therefore, banks can afford to spend upon human capital which leads to accomplish higher profitability. Through the enhancement of profitability banks can influence on financial stability and

economic growth in Bangladesh. Forthcoming researchers can examine the extension of the model by including some added explanatory variables like ownership structure, deposit insurance, asymmetric information, competition between private and nationalized commercial banks, rivalry among banks and DFIs in Bangladesh, deposit insurance etc. Owing to unavailability of the data and for the probable multicollinearity problem we could not have successful instinct of the literature but it could be a remarkable pathway for the upcoming research.

## Appendix

In Table A1 the correlation matrix demonstrates the degree of correlation among the dependent variable and the explanatory variables used in the regression analysis. The matrix represents a weak correlation among the independent variables. These pair wise correlation matrices are the STATA output and the abbreviated forms of Table 5 stand for the elaborated names of the variables stated in Table 2.

**Table A1: Pair wise correlation matrix of the variables consider to impact assessment of the market structure the profitability of commercial banks in Bangladesh**

Variables	ROA	EXMGT	EMPP	LA/TA	BS	NNIR	MC	HHI	SPD	INF	GDP
ROA	1.000										
EXMGT	-0.116***	1.000									
EMPP	0.410***	-0.075	1.000								
LA/TA	0.006	-0.108**	0.023	1.000							
BS	-0.015	0.078*	-0.079*	-0.373***	1.000						
NNIR	0.039	-0.814***	0.056	0.016	-0.005	1.000					
MC	-0.021	0.005	-0.001	-0.005	0.018	-0.011	1.000				
HHI	0.037	0.094**	-0.086*	-0.054	-0.269***	-0.065	-0.048	1.000			
SPD	0.023	0.172***	-0.125**	0.021	-0.152***	-0.047	-0.054	0.642***	1.000		
INF	0.000	0.138***	-0.107**	0.023	-0.111**	-0.075*	-0.016	0.297***	0.818***	1.000	
GDP	-0.065	-0.078*	0.082*	0.019	0.190***	0.029	0.081*	-0.364***	-0.623***	-0.173***	1.000

Coefficients which are significantly diverse from zero at the 1%, 5% and 10% level are marked with \*\*\*, \*\*, \* respectively.

Note:

- Output of Stata and
- Refer to the table-3-2 of descriptive statistics for explanation of the terms of the variables

### Declaration of Conflicting Interests

The authors of this study have no conflict of interest.

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### Foot Note

The concerning Hausman test chi-squared statistics is  $\chi^2(11) = 51.77$  along with the p-value of 0.0000

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