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Market Structure and Performance of Bangladesh Banking Industry: A Panel Data Analysis

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ABSTRACT: ***The banking industry of Bangladesh has gone through unprecedented changes in last two decades and those changes have impact on the performance of banks. This study examines the degree of concentration and performance of the banking industry of Bangladesh for the period of 2009-2018 by using the fixed-effect estimator. The main objective is to determine whether the changes in market structure of banking industry of Bangladesh impact the performance of the industry. This study is based on 33 banks and their 10 years of data. Both the concentration ratio (CR_5) and Herfindahl-Hirschman Index (HHI) has decreased throughout last ten years which indicates that the banking industry of Bangladesh is not concentrated rather market is becoming competitive. Bank performance is negatively associated with capitalization and performance of state-owned banks is worse than private commercial banks for lower efficiency, lack of corporate governance and higher NPL.***

Keywords: Market Structure and Performance, Concentration and Market Share, Bangladesh.

1. INTRODUCTION

Over the last twenty years, the banking sector of Bangladesh has gone through unprecedented changes in its structure in terms of competition, rules and regulations, market structure, etc. Under the influence of World Bank (WB) and International Monetary Fund (IMF), the government of Bangladesh made drastic changes in terms of control of the economy from a controlled economy to a relatively market-based open economy. Though adoptions are stabilization, liberalization and deregulation program against the background of serious macroeconomic imbalances in the early 1980s. In addition, tremendous development in information technology with increased acceptance of internet as a delivery medium contributes to

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rapid reduction in expenses like marketing, processing staff, etc. banks started to provide high-quality services with efficient means like agent banking, mobile financial services (MFS), telebanking, online banking, internet banking, priority banking, point of sales (POS), SWIFT, Reuters, off-shore banking, etc. These technological adoptions have changed the banking sector structure and competitive premises of Bangladesh which has reduced the market share of public banks to private commercial banks.

These technological changes have significant implication in terms of market concentration and competition in the banking and financial sector of Bangladesh. But increased concentration can increase the market power of banks which will foster the collusion of major banks and then competition and efficiency will hinder and customer service can decline. In order to evaluate the structural changes and potential impacts of those changes in market structure, it is imperative to examine the current market structure of the banking industry of Bangladesh. Analysis of market structure and behavior of banks will give direction regarding future actions and policies of the banking sector of Bangladesh. Therefore, the basic objective of this study is to identify the probable impact of structural changes (market share and concentration) and commercial banks of Bangladesh for the period of 2009-2018.

In recent years the literature of market structure has developed a lot in developed countries whereas in a developing country like Bangladesh a little has been done in this field. In Bangladesh, there are not any outstanding papers on market structure from where a holistic scenario of the banking sector structure and concentration can be known. So, it is hoped that this project paper will not only help the policymakers of the central bank but also the existing banks, potential entrants and for other stakeholders of the banking sector of Bangladesh. This study will help the policymakers to evaluate the existing competitive strategy of both private and public banks in Bangladesh also in taking strategies to compete in such a dynamic market sector with sustainability and profitability.

2. LITERATURE REVIEW

The SCP paradigm was first applied by Bain (1951) for industrial organizations and only applied in the manufacturing industry in America. After the initial application, it was started to use in the banking industry to know the correlation between market concentration and profitability of banks. The literature on the measurement of the competition in the banking industry has two different directions: the structural and non-structural approaches. This structure will focus on the structural approach

of the literature. The traditional industrial organization theory of firms is divided into two schools of thoughts namely structure-conduct-performance (SCP) paradigm and efficient structure hypothesis (ESH). The SCP hypothesis demonstrates causal relationship running from the structure of the market and the price-setting behavior of the industry and ultimately the profitability through the price-setting channel (Prasad and Ghosh 2005). The SCP hypothesis infers the degree of competition in the industry from the perspective of structural features (Bain 1951). Actually, SCP hypothesis states that concentration in the industry brings market power and helps to attain monopolistic profits by offering lower rates on deposits and charging higher rates on loans.

SCP hypothesis infers that the price setting is less favorable for the consumer in a highly concentrated market due to non-competitive behaviors of banks. So, the higher the concentration in the market the lesser the competition and higher is the possibility of gaining monopolistic profits. A small number of firms in the market will encourage banks to achieve a joint price-output configuration and to monopolistic profits (Staikouras and Koutsomanoli-Fillipaki 2006, Berger and Hannan 1989). Hence, HSC hypothesis based on the assumption that the concentration in the market weakens competition by fostering the collusive behavior among banks. Collusive behavior increases as the market are concentrated within a small number of firms. It suggests that higher concentration leads to a higher piece which helps to attain abnormal profits (Bain 1951).

So, concentration is inversely related to consumer welfare and the number of firms in the market. Therefore, the price of the firms will get close to the marginal cost if concentration fall which leads to the fall in market power as well. SCP hypothesis was supported by the studies of Heggestad and Mingo (1977), Spellman (1981), Rhoades (1982) and Lloyd-Williams et al. (1994). On the other hand, the second school of thoughts contradicts the traditional SCP hypothesis and the relationship between market structure and profitability by stipulating a competing explanation of the relation between market structure and profitability.

The hypothesis is called efficient structure hypothesis (ESH) which is suggested by Demsetz (1973) and Peltzman (1977). The ESH states that the banking industry's profitability is dependent on the efficiency of operation, the domination of service factors, and the use of scarce resources (Demsetz, 1973; Peltzman 1977). Several studies conducted by Smirlock (1985), Evanoff and Fortier (1988) and Samad (2008) supported this hypothesis. For Bangladesh case, Samad (2008) tests the validity of

two hypotheses (SCP, ESH) in the banking industry of Bangladesh using pooled and annual data for the period of 1999-2002; he found the ESH as the determiner of the banking industry performance of Bangladesh. Some research conducted in emerging markets found support for the efficient structure hypothesis are Seelanatha (2010) on Sri Lanka and Chortareas et al. (2011) on Latin America. This study challenges the line of reasoning of traditional SCP hypothesis and postulates that efficient bank can increase the market share due to their higher profitability in the banking industry of Bangladesh. Consequently, the degree of concentration increases automatically.

Smirlock (1985) and Evanoff and Fortier (1988) states that large market share in the concentrated industry helps to attain higher profitability as efficiency and cost reduction is possible for higher efficiency in operations. Basically, some market-specific factors like- technological and managerial skills of the market leader bring superior performance and generate higher efficiency and market concentration which brings greater profitability. Smirlock (1985) and Evanoff and Fortier (1988) also tries to make a relationship that a relationship exists between market share and bank profitability but not between concentration and profitability.

3. BANGLADESH BANKING INDUSTRY

After the independence of Bangladesh on 16 December 1971 the banking industry of Bangladesh has started its journey with 6 nationalized commercial banks, 2 state-owned specialized banks, and 3 foreign banks. It was till 1980 Bangladesh made huge changes in its policy like privatization and implementation of IMF and WB suggestions for financial reforms. In 1980 Bangladesh government opened the baking industry for the private sector. Scheduled banks can be classified further and in Bangladesh, there are 59 scheduled banks with the latest three banks approved by BB namely Bengal Commercial Bank, Community Bank Bangladesh, and People's Bank.

Bangladesh bank is the sole body which has full control over the scheduled under Bangladesh Bank Order, 1972 and banking Company Act, 1991. The table shows that 6 SCBs holds 25.88% of industry assets and deposit percentage in 27.35%. PCBs are holding the most number of branches which are 4,758, industry shares of 67.07% and deposit share of 65.91%. FCBs are holding 4.62% of industry assets and 3.98% of industry deposits. DFIs are holding 2.43% of industry assets and 2.77% of industry deposits with their 1,407 branches.

Table 01: Banking System Structure of Bangladesh.

Banking System Structure, June 2018. (Billion Taka)						
Bank types	**Number of banks**	**Number of branches**	**Total assets**	**Share of industry assets (%)**	**Deposits**	**Share of deposits (%)**
SCBs	6	3721	3379.52	25.88	2700.63	27.35
DFIs	2	1407	317.59	2.43	273.32	2.77
PCBs	40	4758	8758.3	67.07	6508.19	65.91
FCBs	9	69	603.86	4.62	392.75	3.98
Total	57	9955	13059.3	100	9874.89	100

Source: Annual Report of Bangladesh Bank 2018

In measuring the performance of the banking industry ROA is a good tool. The following table presents the ROA trend of different types of banks from 2010 to June 2018.

Table 02: ROA by Types of Banks.

Return on Assets (%)									
Bank type	2010	2011	2012	2013	2014	2015	2016	2017	2018 June
SCBs	1.10	1.20	-0.56	0.59	-0.55	-0.04	0.16	0.21	-0.68
DFIs	0.20	0.10	0.06	-0.40	-0.68	-1.15	-2.80	-0.62	-1.62
PCBs	2.10	1.60	0.92	0.95	0.99	1.00	1.03	0.89	0.57
FCBs	2.90	3.20	3.27	2.98	3.28	2.92	2.56	2.24	2.75
Total	6.30	6.10	3.69	4.12	3.04	2.73	0.95	2.72	1.02

Source: Annual Report of Bangladesh Bank 2018

It seems that FCBs performed well compared to the other three types of banks from 2010 to 2018. On the other hand, both SCBs and DFIs performed poorly even ROA was negative in several years. PCBs show a good trend in ROA except for the year of 2018 downturn. ROA of SCBs falls to negative 0.56% in 2012 due to loss in some of the state-owned commercial banks. In recent time of 2018, ROA was -0.68% which shows inefficiency and lack of corporate governance in SCBs. In the case of the percentage of NLP to total loans distribution, SCBs and DFIs are in the highest percentage. In 2011, NPL percentage of SCBs was minimum at 11.3% of total disbursed loans and it becomes maximum in 2018 at 28.24% which is alarming. The percentage of NPL was above 20% in the

year 2014, 2015, 2016, 2017 and 2018. Such a huge percentage of NPL decreases the profitability of SCBs as large amount needs to maintain as provision from the net profit of the banks. DFIs have the record of the highest percentage of NPL which was 32.81% in 2014 and in all the years the percentage was more than 20%. In 2018 NPL was 21.68% slightly decreased from 23.39 in 2017. For PCBs, the ratio of NPL was comparatively low which ranges from a minimum of 2.9% to 6.01%. In 2018, NPL for PCBs was maximum at 6.01% which shows that PCSs are also incurring NPL in their loan portfolio.

Table 03: Category-wise NPL Ratio Trend: 2010-2018.

Bank type	2010	2011	2012	2013	2014	2015	2016	2017	2018 June
SCBs	16%	11%	24%	20%	22%	21%	25%	27%	28%
DFIs	24%	25%	27%	27%	33%	23%	26%	23%	22%
PCBs	3%	3%	5%	5%	5%	5%	5%	5%	6%
FCBs	3%	3%	4%	6%	7%	8%	10%	7%	7%

Source: Annual Report of Bangladesh Bank 2018

To examine the market structure of the banking industry of Bangladesh the trend of concentration index has been calculated by using CR_k and Herfindahl-Hirschman Index (HHI) over the period of 2009-2018. Table 4.3 presented below shows the CR3, CR5, and HHI of total assets, total deposits and total loans as the reflection of the concentration of the commercial banking industry of Bangladesh. The results show that HHI for total assets ranging from 587 to 433 for the period of 2009-2018. This range indicates that the banking sector is unconcentrated in Bangladesh. Moreover, HHI decreases regularly in each year which means the banking industry of Bangladesh is towards the competitive position.

CR3 for assets ranges from 0.33 to 0.25 for the period of 2009-2018 and CR3 decreases continuously throughout the period of 2009-2018. Apart from that CR5 for assets ranges from 0.43 to 0.35 throughout the period of 2009-2018 and decreases regularly. In the deposits, side HHI ranges from 558 to 455 throughout the period of 2009-2018. It indicates that the banking industry of Bangladesh is unconcentrated and competition is intensifying in each year. On the other hand, both CR3 and CR5 were within the range of 0.33 to 0.27 and 0.42 to 0.37 respectively. Such decrease in concentration ratio indicates that market structure is getting competitive day by day throughout the period of 2009-2018.

Table 04: Trends in the Concentration of Bangladesh Banking Industry: 2009-2018.

Years	Total Assets			Total Deposits			Total Loans		
	CR3	**CR5**	**HHI**	**CR3**	**CR5**	**HHI**	**CR3**	**CR5**	**HHI**
2009	0.33	0.43	587.70	0.33	0.42	558.63	0.29	0.39	497.93
2010	0.31	0.41	554.34	0.32	0.41	539.74	0.28	0.38	470.67
2011	0.30	0.40	515.82	0.30	0.41	515.36	0.28	0.38	474.70
2012	0.28	0.38	480.73	0.29	0.39	491.89	0.28	0.38	470.03
2013	0.29	0.39	487.84	0.29	0.39	491.40	0.25	0.34	432.62
2014	0.28	0.38	475.81	0.29	0.39	489.90	0.24	0.34	423.64
2015	0.28	0.37	468.61	0.29	0.39	487.04	0.23	0.31	404.08
2016	0.28	0.37	469.83	0.29	0.39	496.59	0.23	0.31	405.07
2017	0.26	0.36	444.57	0.28	0.37	469.05	0.22	0.30	392.78
2018	0.25	0.35	433.30	0.27	0.37	455.78	0.21	0.30	390.98

Source: Author's own calculation

Note: The Herfindahl-Hirschman Index (HHI) is multiplied by 10,000

Finally, HHI in case of total loans ranges from 497 to 390 for the period of 2009-2018 which means the banking industry of Bangladesh is un concentrated. Moreover, HHI decrease in the year throughout the period which means the market is getting good competitive, on the other hand, CR3 ranges from 0.29 to 0.21 and decreases continuously throughout the period of 2009-2018 which means banking industry of Bangladesh is heading towards good competition. CR5 ranges from 0.39 to 0.30 and decreases throughout the period of 2009-2018 which means the influence of the top five banks in loan disbursement decreases due to competition. On the basis of the market concentration of commercial banks of Bangladesh for the last ten years, it can be inferred that the banking industry is heading towards a good competition. The main reason for such a decrease in concentration index is the new entrance in this industry and technological advancement of private commercial banks which increases the competitive position of private commercial banks over state-owned commercial banks in Bangladesh.

4. DATA AND METHODOLOGY

The target population is the banking sector of Bangladesh and the goal is to evaluate the efficiency of the banking industry by determining market concentration and performance of banks. After analysis the selected 33 banks with their starting of operation, listing years, age of starting and age of listing. Age of listing some banks like BRAC Bank Ltd., First Security Islami Bank Ltd., Premier Bank Ltd., Shahjalal Islami Bank Ltd., and Trust Bank Ltd. forced to start the analysis from 2009. For the convenience of applying statistical models that requires large data set the sample is selected in total 33.

This study includes cross-sectional data for 33 commercial banks operating in Bangladesh for the period of 2009-2018. For serving the purpose of this study the annual data of selected 33 banks have been collected from 2009 to 2018 for 10 years period. Those data provide a total of 330 observations. Data earlier than 2009 is not available for most of the banks so I was forced to collect data from 2008 for 33 banks operating in Bangladesh. Data has been collected from secondary sources like annual reports of the banks, DSE website, and other online and offline sources. In collecting detailed of particular banks the website of that bank helped a lot with detailed information.

4.1 The k Bank Concentration Ratio

The concentration ratio is a widely used tool to measure the market structure which requires limited data and the calculation is comparatively simple. The calculation requires ranking the banks in descending order of the market share then summing the K number of banks. So, the formula becomes:

$$CR = \sum_{i=1}^{k} Si \quad (1)$$

Where, S_i is the market share ofi^{th} bank when all the banks are ranked in descending order. In this study, the market share is measured on the basis of total assets, total deposits, and total loans. This study calculates both CR3 and CR5 where the value of k is 3 and 5. Although CR is easy to calculate this measure give emphasis on particular large banks, neglects many small banks in the market. There is no rule in using the number of banks in calculating CR so the number of banks selected is somewhat arbitrary. Concentration ratio may be considered as one point in the concentration curve where value ranges from zero to unity. The index approached zero if there are an infinite number of equally sized banks and it will be equal to unity if banks considered in the calculation of CR is the entire industry (Bikker and Haaf 2000, Al-Muharrami, Matthews and

Khabari 2006). For these problems, HII is calculated to eliminate these problems.

4.2 The Herfindahl-Hirschman Index (HHI)

The Herfindahl-Hirschman Index (HHI) is used to evaluate the concentration indices and used as a benchmark for measuring the concentration. In most of the developed countries like USA, UK, Germany HHI is used to evaluate the market structure and based on the HHI regulators take actions in the process of antitrust actions. The following is the formula for calculating HHI:

$$HHI = \sum_{i=1}^{n} S_i^2 \qquad (2)$$

Where n is the total number of banks in the industry, S^2 is the squareof the market share of each bank in the industry. After squaring the market share of each bank the squire is summed up and multiplied by 10,000. HHI can be zero with the infinite number of firms to 10,000 in the market having just one firm. HHI is a static measure, therefore, measure the market concentration in a point of time. In the calculation of HHI largest banks get heavier weights which show their greatest importance in the market. HHI below 0.01 or 100 indicates a highly competitive market, HHI below 0.1 or 1,000 indicates a less concentrated market, HHI between 0.1 to 0.18 (1,000 to 1,800) indicates moderate market concentration and HHI above 0.18 or 1,800 indicates high market concentration.

4.3 Dependent Variable

In this study return on assets (ROA) (i.e. net income/total assets) is the dependent variable which is a measure of bank performance. Banks provide multiple products and services so the performance of a specific product or service is not a good measure of a bank's performance. In such multi-product and services industry cross-subsidization is very common compared to other product and service-based industry. The study conducted by Lloyd-Williams et al. (1994), this project paper used net profit as the measure of profitability as net profit is a consolidated figure which considers all products and services regarding profit and losses. So, the profit figure overcomes the limitation of cross-subsidization.

4.4 Independent Variable

For this study, six explanatory variables have been selected and those variables are firm-specific or internal variable. Those variables are concentration ratio of five banks (CR5) for assets, deposits and loans; market share (MS_i) of i^{th}bank; capital to total assets ratio (CAPASS);

loans to deposit ratio (LDEP); assets size of the bank (LTA) and a dummy variable OWNER of the bank. A summary table of the variables used in this study is given below:

Table 05: List of the Variables.

Variables	Notation	Description	Expected Sign
Dependent variable			
Return on assets	ROA	Net income to total assets which is a measure of the profitability of bank	
Independent variable			
Five banks concentration ratio	CR5	CR in terms of assets, loans and deposits	+
Market share of i^{th}bank	MS_i	MS in terms of assets, loans and deposits	+
Capital to total assets ratio	CAPASS	Capital to total assets	-
Ratio of loans to deposits	LDEP	Loans to deposit ratio	+
Asset size of the bank	LTA	Assets size of banks	+
Ownership of banks	OWNER	Public or private ownership	+/-

Source: Referrals from previous research

The impact of a predictor variable on the dependent variable can be both positive and negative or in both ways. The way of impact of the variable on the performance of banks is discussed below:

Concentration ratio (CR): Concentration ratio is a measure of market structure and this study will use concentration ration of five top banks. The concentration ratio is calculated from three aspects like assets, loans, and deposits. The higher the concentration ratio is the lower the competition and the higher the performance of a bank. So, it is expected that the concentration ratio will have a positive impact on ROA. The concentration ratio is calculated by ranking the banks in descending order and then summing up the first five values and divided by the sum of total observations in each year.

Market share (MS): Market share is used to measure the bank's efficiency in terms of assets size, loans size, and deposits size. It is

expected that ROA is positively related to the market share which means for a large market share performance will be better compared to other banks. Market share is calculated by dividing each observation by summation of a total number of observations. Market share will indicate the competitive position of the bank in pricing strategy and efficiency.

Capital to assets ratio (CAPASS): Capital to total assets ratio will include the firm-specific risk factor. It is expected that capital to asset ratio will negatively be related to ROE as decrease capital compares to assets may the bank vulnerable so it will negatively impact the profitability of the bank. Lloyd-Williams et al. (1994) argued that lower capital ratios are traditionally associated with greater risk-taking so the coefficient of this variable is expected to be negatively related.

Loans to deposit ratio (LDEP): Loan to deposit ratio is a measure of how much loans and advances out of deposit collection of a specific bank. It is expected that the impact of ROA will be positive which means if a bank can prove a higher percentage of loans and advances from deposit collection their profitability will be higher. In this regard, Bangladesh Bank (BB) has discretion in setting the loans to deposit ratio. A high ratio of loan to deposit indicates that banks are utilizing their assets in earning interest.

Asset size of banks (LTA): The assets size of banks is included to consider the differences brought about by size such as economies of scale. It is expected that LTA will positively impact ROA that means the size of the banks will persuade the bank in attaining higher profits. In this study total assets are considered as LTA.

Ownership of banks (OWNER): The last variable is ownership which is a dummy variable. Ownership is included to incorporate the specific characteristics of the Bangladeshi banking industry. Ownership of banks is represented by binary values here 1 for public banks and 0 for all other commercial banks.

4.5 Model Specification

In this study, the following equation has been estimated in testing the relevance of SCP and ESH in the banking sector of Bangladesh as suggested by Lloyd-Williams, Molyneux, and Thornton (1994) and Samad (2008) in the banking industry of Spain and Bangladesh respectively. The hypothesized relationship among variables are-

ROA = α_{0+} α_1CR_assets+ α_2MS_assets+α_3CAPASS+ α_4LDEP+ α_5LTA+ α_6OWNER(3)

ROA = α_{0+} α_1CR_deposits+ α_2MS_deposits+α_3CAPASS+ α_4LDEP+ α_5LTA+ α_6OWNER(4)

ROA = α_{0+} α_1CR_loans+ α_2MS_loans+α_3CAPASS+ α_4LDEP+ α_5LTA+ α_6OWNER(5)

5. RESULT AND DISCUSSION

The Hausman test has been conducted to determine whether to use a fixed-effect model or random effect model in the data set. If the null hypothesis can be rejected at the level of efficiency of 5% then it can be said that the differences in the coefficient of the variables are due to some other systematic variable. In such scenario the fixed effect model is appropriate for this study. For the opposite scenario the appropriate model would be a random effect model. The result of the Hausman test is shown below:

Table 06: Summary of Hausman Test.

Model	**chi2 (5)**	**P-value**	**Decision**
Model I-ROA	373.23	0.00	Fixed Effect Model
Model II-ROA	376.43	0.00	Fixed Effect Model
Model III-ROA	354.79	0.00	Fixed Effect Model

Source: Output from STATA

As per the P-value concerned the null hypothesis is rejected as P-value is less than 5% significance level which justifies the use of the fixed-effect model when the performance is measured by ROA. So, Hausman test indicates that the differences in the coefficient are systematic. So, the appropriate model is a fixed effect model rather random effect model. All three models show P value less than 5% so the fixed-effect model is appropriate for this data set. From the comprehensive analysis of this study, it becomes clear that a number of factors regarding the market structure of the banking industry of Bangladesh have influence on the performance (ROA). The findings of this study try to relate the impact of each independent variable on the performance of banks and the performance measures of banking industry of Bangladesh is discussed below:

Table 07: Summary of Fixed-Effect Analysis.

Variables	**Model I-ROA**		**Model II-ROA**		**Model III-ROA**	
	Coeffi cient	**P-value**	**Coeffi cient**	**P-value**	**Coeffi cient**	**P-value**
cr_assets	**0.115**	**0.000**	**-**	**-**	**-**	**-**

ms_assests	**0.041**	**0.720**	**-**	**-**	**-**	**-**
cr_deposits	**-**	**-**	**0.180**	**0.000**	**-**	**-**
ms_deposits	**-**	**-**	**0.046**	**0.722**	**-**	**-**
cr_loans	**-**	**-**	**-**	**-**	**0.019**	**0.331**
ms_loans	**-**	**-**	**-**	**-**	**-0.053**	**0.604**
capass	**-0.083**	**0.000**	**-0.084**	**0.000**	**-0.059**	**0.000**
ldep	**-0.002**	**0.744**	**-0.003**	**0.645**	**-0.002**	**0.728**
lta	**-0.003**	**0.029**	**-0.003**	**0.043**	**-0.006**	**0.000**
Constant	**0.337**	**0.388**	**0.002**	**0.967**	**0.133**	**0.033**
R-square	**0.335**		**0.6444**		**0.3028**	
Prob>F	**0.000**		**0.000**		**0.000**	

Source: Output from STATA

The following section will compare the actual result with the expected result and give interpretation of each outcome.

ROA = α_{0+} α_1CR_assets+ α_2MS_assets+α_3CAPASS+ α_4LDEP+ α_5LTA+ α_6OWNER

Table08: Summary Result of Model I (ROA).

Variables	**Expected Sign**	**Fixed Effect Model**	
		Actual Sign	**Significance**
CR_assets	+	**+**	√
MS_assets	+	**+**	×
CAPASS	-	**-**	√
LDEP	+	**-**	×
LTA	+	**-**	√
OWNER	+/-		

Source: Referrals from previous research and STATA output

From the summary table, it can be seen that the main two-variable concentration ratio of assets and market share in terms of assets has a positive influence on ROA as expected. The concentration ratio of assets is significant but market share is showing insignificant and this would be possible if with a high market share banks make losses then ROA may decrease. Capital to assets ratio is negative as expected which means higher capital compare to assets may decrease the profitability of banks. Loan to deposit ratio and asset size showing opposite sign and probability value of LTA is insignificant whereas LTA is significant. LEDP may have

a negative impact if loan amount increases compare to deposit amount and loan default rate increases then ROA may decrease. So, the performance of banks will depend on how they are managing their assets, capital, assets, loans, and deposits.

ROA = α_{0+} α_1CR_deposits+ α_2MS_deposits+α_3CAPASS+ α_4LDEP+ α_5LTA+ α_6OWNER

Table 09: Summary Result of Model II (ROA).

Variables	Expected Sign	Fixed Effect Model	
		Actual Sign	Significance
CR_deposits	+	+	√
MS_deposits	+	+	×
CAPASS	-	-	√
LDEP	+	-	×
LTA	+	-	√
OWNER	+/-		

Source: Referrals from previous research and STATA output

From the summary table, it can be seen that the main two-variable concentration ratio of deposits and market share in terms of deposits has a positive influence on ROA as expected. The concentration ratio of deposits is significant but market share is showing insignificant and this is possible if with a high market share banks make losses due to the high cost of deposits then ROA may decrease.

Capital to assets ratio is negative as expected which means higher capital compare to assets may decrease the profitability of banks. Loan to deposit ratio and asset size showing opposite sign and probability value of LDEP is insignificant whereas LTA is significant. LEDP may have a negative impact if loan amount increases compare to deposit amount and loan default rate increases then ROA may decrease. So, the performance of banks will depend on how they are managing their assets, capital, assets, loans, and deposits.

ROA = α_{0+} α_1CR_loans+ α_2MS_loans+α_3CAPASS+ α_4LDEP+ α_5LTA+ α_6OWNER

From the summary table, it can be seen that main two-variable concentration ratio of loans has a positive impact on ROA as expected but market share in terms of loans has a negative influence on ROA which

implies that if banks cannot manage its loan portfolio properly then the performance of banks may be negatively impacted.

Table 10: Summary Result of Model III (ROA).

Variables	Expected Sign	Fixed Effect Model	
		Actual Sign	Significance
CR_loans	+	+	×
MS_loans	+	-	×
CAPASS	-	-	√
LDEP	+	-	×
LTA	+	-	√
OWNER	+/-		

Source: Referrals from previous research and STATA output

Both concentration ratio and market share of loans are insignificant which implies that actual sign of the study may change on the basis on bank's capability in managing loan portfolio as in Bangladesh NPL is a major so a percentage of may have the influential impact of ROA of banks. Capital to assets ratio is negative as expected which means higher capital compare to assets may decrease the profitability of banks. Loan to deposit ratio and asset size showing opposite sign and probability value of LTA is significant whereas LDEP is insignificant. LEDP may have a negative impact if loan amount increases compare to deposit amount and loan default rate increases then ROA may decrease. So, the performance of banks will depend on how they are managing their assets, capital, assets, loans, and deposits. There is some issue related with ownership of banks where public commercial banks hold large market share in terms of assets, loans, and deposits but their performance is not up to the marks due to huge amount of NPL and provision for NPL from the net profit of the banks. ROA of public commercial banks was negative in some years as net profit was negative although they have a huge amount of assets, deposits, and loans.

6. CONCLUSION AND POLICY IMPLICATION

The concentration ratio namely CR3 and CR5 and the Herfindahl-Hirschman Index (HHI) have shown that the concentration ratio of the banking industry of Bangladesh has decreased gradually in each which shows greater competitiveness within the industry. So, the policymakers should keep considering the issue of competitiveness while making policies for banking industry so that it continues which will bring superior

services for the customers and industry structure will get stronger day by day. So, the responsibility of the policymaker is to intensify the competitiveness in this industry to get the best out of the banks. In recent years the banking industry of Bangladesh has undergone unprecedented changes. Those changes have resulted in extreme competition and productive efficiency in the banking industry of Bangladesh. Another impact of those changes is the change in the market structure of the banking industry of Bangladesh. The goals of this study were to evaluate the market structure and performance of the banking industry of Bangladesh of the period of 2009-2018. In doing the study the structure conduct performance hypothesis and efficient structure hypothesis is tested in the context of assets, deposits, and loans in Bangladesh to examine the changes in market concentration and market share in the industry. The result of the analysis has shown that the performance of the banking industry positively related to the concentration of the industry not the market share of banks. The banking industry's performance is positively related to market concentration and negatively related to the market share of individual banks.

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