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Research Paper

Impact of Firm-Specific Attributes and Macroeconomic Conditions on Performance: Empirical Evidence from Banking Sector of Bangladesh

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ABSTRACT

Purpose: To explore the impact of firm-Specific attributes and macroeconomic conditions on profitability, this study has been carried out.

Methodology: Net interest margin (NIM) and return on assets (ROA) are used to measure profitability while total assets, loan deposit ratio, and capital adequacy ratio are considered to represent firm-Specific variables. In addition, gross domestic product, inflation, and real interest rate are incorporated as macroeconomic indicators. Annual reports of 19 banks listed with Dhaka Stock Exchange (DSE) have been used to collect data and the World Development Indicators (WDI) of World Bank (WB) for 2004-15. Pooled, fixed-effect, and random-effect regressions are conducted followed by Breusch and Pagan Lagrangian Multiplier Test and Hausman test.

Findings: Loan deposit ratio has shown significant positive impact on both profitability measures while significant negative impact was observed for real interest rate. On the other hand, significant positive impact of capital adequacy ratio has been identified only on return on assets. At the end, this study has concluded that firm-specific attributes and macroeconomic conditions have significant impact on profitability (performance) in banking sector of Bangladesh.

Originality: The findings of the study will help the policymakers to know about key firm-specific variables and macroeconomic factors related with the performance of the banking sector.

Keywords: Firm-Specific Attributes; Macroeconomic Predictors; Profitability; Banking Sector; Bangladesh.

1. Introduction

An efficient and progressive banking sector is required for ensuring a sustainable economic growth (Riaz & Meher, 2013). After the independence, the economy of Bangladesh has experienced a steady growth where banking sector has a substantial contribution. Though the banking sector of Bangladesh has flourished a lot over last couple of decades, it has not mapped out a developed banking system, yet which is a pre-requisite for sustainable economic growth (Levine & Zervos, 1998). After the global

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financial crisis in 2008 and Stock Market Crash of Bangladesh in 2011, there have been several reforms in regulation and operation of banking industry in Bangladesh (Sufian & Kamarudin, 2012). These changes were made to increase the operational efficiency and profitability of the banks (Pradhan & Shrestha, 2016).

Firm performance is affected by various factors. These can mainly be classified as firm-specific attributes and macroeconomic predictors of a country. Firm-Specific attributes are the internal elements of an enterprise which is controlled by the management of that enterprise whereas macroeconomic characteristics are the external elements to the enterprise which are entirely subjected to economic and regulatory condition of the country.

To maintain consistency in performance, management of a bank may manipulate the firm-specific variables which include but not limited to size of the firm, asset quality, proportion of loan and deposit, management efficiency, capital adequacy ratio, and liquidity. However, management needs to adopt a collaborative approach to deal with the macroeconomic predictors like GDP growth, real interest rate, inflation, exchange rate, etc. This investigation will endeavor to explore the effect of firm-explicit properties and macroeconomic conditions on profitability in banking sector of Bangladesh

2. Literature Review

Several studies have been done to analytically explore the impact of firm-specific predictors and macroeconomic indicators on firm's performance. For investigating the bank specific and macroeconomic determinants of profitability of Nigerian Commercial Banks, Ebenezer et al (2017) studied 16 commercial banks of Nigeria for the period of 2010-15. In their study it is identified that capital adequacy, liquidity, and gross domestic product (GDP) growth have a significant positive impact on profitability measured by return on assets (ROA) and return on equity (ROE). It interprets that the profitability of a bank would increase with the rise in capital adequacy, increase of liquid assets, and growth in GDP of a particular country. However, this result is found inconsistent with the study of Molyneux and Thornton (1992). By studying the European banks, they concluded that increase in liquidity position would significantly and negatively influence profitability. Besides, Ebenezer et al (2017) also observed that bank efficiency ratio has a significant negative impact on profitability (Rashid & Jabeen, 2016).

The dynamics of firm specific attributes, macroeconomic variables, and profitability was studied by Alper and Anbar (2011) for the listed commercial banks in Turkey. They identified that the return on assets (ROA) of a bank would increase for the increase in bank size and non-interest income. However, they also found that as a bank increases its' loans to assets ratio and follow up loans increases relative to total loan portfolio, the ROA may experience a negative consequence. Conversely, significant positive impact on return on equity (ROE) has been concluded for the change in size of bank and real interest rate.

In perspective of Pakistan, for 2006-10, variability of profitability due to the change of bank specific attributes and macroeconomic conditions was explored Riaz and Mehar (2013). They identified that bank size, interest rate, deposits to assets ratio, and credit risk significantly influence ROE. However, significant impact on ROA has been observed for credit risk and interest rate. In 2014, Onuonga, by studying, top six commercial banks of Kenya for 2008-13, found significant impact of bank size, bank operation expenses, strength of capital, ownership structure, and loans to assets ratio on ROA.

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In Nepal, Pradhan and Shrestha (2016) reviewed the relationship by considering bank specific attributes i.e. quality of assets, capital adequacy ratio, liquidity management, management efficiency, credit risk, employee expenses, and other operating expenses, and macroeconomic variables i.e. GDP growth and inflation. They have used on (ROA) and net interest margin (NIM) to measure profitability. They have found empirical evidence that adequacy ratio and management efficiency have significant and positive impact on ROA and NIM. In addition, they concluded that comparing to macroeconomic variables, bank specific attributes relatively have more significant impact on profitability.

For the Turkish Commercial Banks, Topak and Talu (2017) studied bank-specific attributes and macroeconomic conditions as the determinants of profitability. They used the ratio of interest on loans to the interest on deposits (ILID) as a measurement scale of NIM and non-performing loans to total loans (NPL) to represent credit risk. They found that profitability of the banks is significantly influenced by ILID and company size. On the other hand, NPL and capital adequacy ratio have depicted a negative influence on profitability.

In perspective of Bangladeshi banking sector, Sufian and Habibullah (2009) conducted a study by considering 37 commercial banks for the period of 1997 to 2004. They have used loans intensity, bank size, credit risk, nontraditional activities, cost, and bank capitalization to represent bank-specific characteristics. Besides, GDP and inflation rate were selected to indicate macroeconomic conditions where ROA, ROE, and NIM were incorporated to represent bank performance. The study concluded a positive impact of loans intensity, credit risk, and cost and negative impact of non-interest income on bank performance. On the other hand, except for negative impact of inflation on NIM, macroeconomic variables exhibited insignificant influence on profitability.

In another study, for 2000-2010, Sufian and Kamarudin (2012) explored the extent of the influence of bank-specific attributes and macroeconomic characteristics on profitability. They used six bank-specific determinants (asset quality, management quality, non-traditional activities, capitalization, bank size, and liquidity) for predicting the possible impact on banks' performance. Apart from asset quality, all bank specific attributes have shown significant positive impact on banks performance (ROA, ROE, and NIM). Macroeconomic variables i.e. GDP, inflation, and market concentration have also found to be significant in their study.

In addition, studies on this issue have been done by Liu and Wilson (2010), Bennaceur and Goaied (2008), Hannan and Prager (2009), Singh and Chaudary (2009), Sufian and Habibullah (2009), Dietrich and Wanzenried (2010), Sufian (2010, 2011), and Gilbert and Wheelock (2007). They have also reported different results on the dynamics of profitability with firm and macroeconomy related variables.

From the review of relevant literatures in context of Turkey (Alper & Anbar, 2011; Topak & Talu, 2017), Europe (Molyneux & Thornton, 1992), Nigeria (Ebenezer et al, 2017), Pakistan (Riaz & Mehar, 2013), Kenya (Onuonga, 2014), Nepal (Pradhan and Shrestha, 2016), and Bangladesh (Sufian & Habibullah, 2009; Sufian & Kamarudin, 2012), Japan (Liu & Wilson, 2010), Tunisia (Bennaceur & Goaied, 2008), Korea (Sufian, 2011) Switzerland (Dietrich & Wanzenried, 2010), and Thailand (Sufian, 2010), it can be said that, in context of banking sector, a conclusive decision can't be drawn on the extent of influence of bank-specific attributes and macroeconomic conditions on profitability. Due to the differences in temporal spread, country characteristics, and use of different variables, studies of different authors have identified different mixes of positive and negative impacts.

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In addition, it has been observed that study on this topic in perspective of Bangladesh has received less attention from the researchers. Hence, there are lack of relevant literatures on this topic for facilitating the understanding of this dynamics. Thus, this study aims to investigate this issue by considering selected variables related to firm and macroeconomy in view of Bangladeshi banking sector. It is expected that the result of this study will help the academics, bankers, and the policy makers to understand how the changes in different attributes of a bank and macroeconomic conditions of Bangladesh would impact the performance of the bank.

3. Objective of the Study

The key objective of the paper is:

- To identify the effect of firm-oriented attributes and macroeconomic conditions on the profitability of banking sector of Bangladesh.

4. Methodology of the Study

4.1 Sample and Data Collection

At present, there are 30 commercial banks listed with Dhaka Stock Exchange (DSE). Among these, 19 listed conventional banks have been selected for this study. Table 1.0 shows the list of selected banks. Data on different bank-specific attributes i.e. total assets, loan-deposit ratio, capital adequacy ratio, and profitability i.e. net interest margin, return on assets, of these banks have been collected for the period of 2004 to 2015. In this purpose, annual reports of the banks have been sourced from their official website and Dhaka Stock Exchange (DSE) library.

On the other hand, data of selected macroeconomic variables i.e. gross domestic product, inflation, and real interest rate have been collected from the World Development Indicators (WDI) managed by World Bank. This data source has also been used by Sufian and Kamarudin (2012), Onuonga (2014), Khan, Kauser, and Abbas (2015), and Ebenezer et al (2017) for similar studies.

Table 1 – Sample of the Study

AB Bank Limited	Mutual Trust Bank Limited	Rupali Bank Limited
Bank Asia Limited	National Bank Limited	Standard Bank Limited
Dutch-Bangla Bank Limited	NCC Bank Limited	Southeast Bank Limited
Dhaka Bank Limited	One Bank Limited	The City Bank Limited
Eastern Bank Limited	Prime Bank Limited	United Commercial Bank Limited
IFIC Bank Limited	Pubali Bank Limited	Uttara Bank Limited
Mercantile Bank Limited		

4. Conceptual Framework

In pursuit of identifying the impact of firm-specific attributes and macroeconomic conditions on profitability this study is leveraging on the conceptual framework illustrated in figure 1. Total assets, loan-deposit ratio, and capital adequacy ratio of the selected banks are representing firm-Specific attributes while GDP, inflation, and real interest rate are indicating macroeconomic conditions of Bangladesh. On the other hand,

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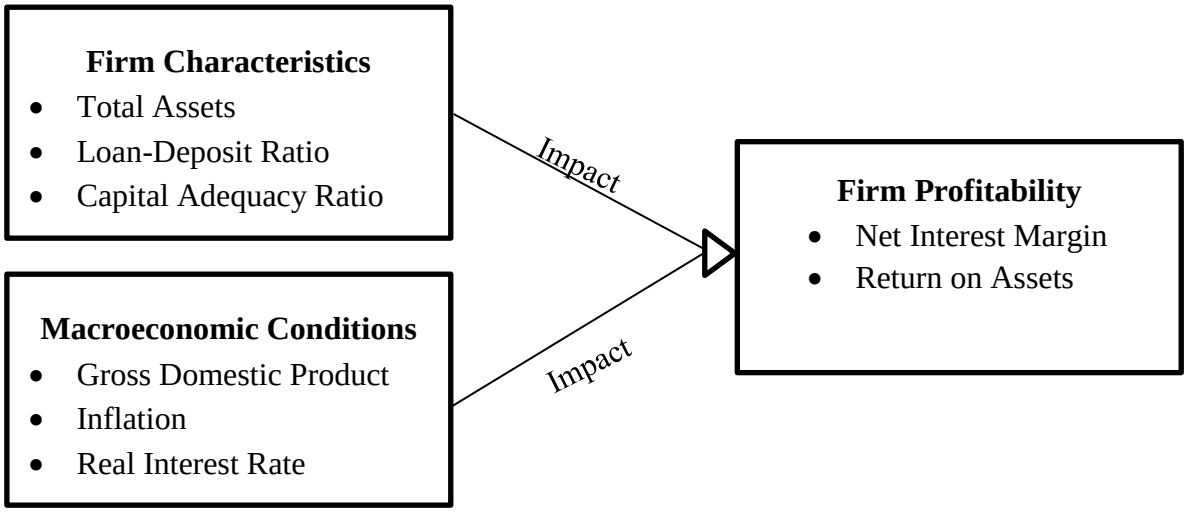
net interest margin and return on assets have been considered to measure bank profitability.

Figure 1 – Conceptual Framework of the Study



5.1 Models and Variables

The conceptual framework of this study is implemented through the following models:

$$NIM_{it} = \alpha_0 + \beta_1 LNTA_{it} + \beta_2 LDRI_{it} + \beta_3 CAR_{it} + \beta_4 LNGDP_{it} + \beta_5 LNF_{it} + \beta_6 RIR_{it} + \varepsilon_{it}$$

(Model 1)

$$ROA_{it} = \alpha_0 + \beta_1 LNTA_{it} + \beta_2 LDRI_{it} + \beta_3 CAR_{it} + \beta_4 LNGDP_{it} + \beta_5 LNF_{it} + \beta_6 RIR_{it} + \varepsilon_{it}$$

(Model 2)

In the models, natural logarithm of total assets (LNTA), loan-deposit ratio (LDR), and capital adequacy ratio (CAR) representing firm-Specific attributes and natural logarithm of gross domestic product (LNGDP), inflation (INF), and real interest rate (RIR) representing macroeconomic conditions are considered as independent variables. In model I, net interest margin (NIM) is incorporated to represent profitability while in model II profitability is indicated by return on assets (ROA).

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Table 2 – Descriptions of Variables

Variable Name	Description	Source
Dependent Variables		
NIM	Ratio of net interest income to total assets expressed in percentage	Pradhan and Shrestha (2016), Topak and Talu (2017), Sufian and Kamarudin (2012), Molyneux and Seth (1998)
ROA	Ratio of net profit after tax to total assets expressed in percentage	Ebenezer et al (2017), Alpe and Anba (2011), Riaz and Mehar (2013), Pradhan and Shrestha (2016), Sufian and Kamarudin (2012), Kosmidou (2008)
Independent Variables		
LNTA	Natural logarithm of total assets	Alper & Anbar (2011), Riaz and Mehar (2013), Onuonga (2014), Topak and Talu (2017), Sufian and Kamarudin (2012)
LDR	Ratio of total loans to total deposits expressed in percentage	Al-Qudah and & Jaradat (2013)
CAR	Ratio of total eligible capital to total risk weighted assets expressed in percentage	Ebenezer et al (2017), Pradhan and Shrestha (2016), Topak and Talu (2017)
LNGDP	Natural logarithm of gross domestic product	Ebenezer et al (2017), Pradhan and Shrestha (2016), Sufian and Kamarudin (2012), Kosmidou (2008)
INF	Percentage change in the price of a basket of consumer goods and services	Pradhan and Shrestha (2016), Sufian and Kamarudin (2012)
RIR	Lending interest rate adjusted for inflation	Alper and Anbar (2011), Riaz and Mehar (2013)

5.2 Hypothesis

Following hypothesis would be tested by using the above-mentioned models:

H_{01}: There is no significant impact of firm-specific attributes and macroeconomic conditions on NIM in the Banking Sector of Bangladesh

H_{A1}: There is significant impact of firm-Specific attributes and macroeconomic conditions on NIM in the Banking Sector of Bangladesh

H_{02}: There is no significant impact of firm-Specific attributes and macroeconomic conditions on ROA in the Banking Sector of Bangladesh

H_{A2}: There is significant impact of firm-Specific attributes and macroeconomic conditions on ROA in the Banking Sector of Bangladesh

5.3 Data Analysis

For analyzing the data, descriptive, correlation, and regression analysis are used. In regression, pooled, fixed effect and random effect model are done. To determine the suitability of regression models, Breusch and Pagan Lagrangian Multiplier (LM) Test

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and Hausman test are conducted. The null hypothesis and alternative hypothesis of Breusch and Pagan LM Test are:

- Null Hypothesis: Pooled regression model is appropriate;
- Alternative Hypothesis: Random effect model is appropriate.

On the other hand, the null hypothesis and alternative hypothesis of Hausman test are:

- Null Hypothesis: Random effect model is appropriate;

- Alternative Hypothesis: Fixed effect model is appropriate.

In addition, Microsoft Excel (version 2016) is used to perform the descriptive and correlation analysis and regressions are conducted with Stata (version 13).

6. Analysis and Discussions

6.1 Descriptive Analysis

Descriptive statistics of the variables representing firm characteristics, macroeconomic conditions, and profitability are depicted in table 3.0. It can be observed that mean of NIM and ROA are 2.3095 and 1.2785 respectively. LNTA, LDR, and CAR have mean value of 25.1183, 83.2716, and 10.7829 respectively. LNGDP, INF, and RIR are showing mean value of 29.4112, 7.5497, and 5.5785 respectively. In terms of standard deviation, the highest value of 9.6307 is found for LDR followed by 4.1921 of CAR and the lowest value of 0.2062 is identified for LNGDP.

Table 3 – Descriptive Statistics

Variables	Mean	Std. Dev.	Kurtosis	Skewness	Minimum	Maximum
NIM	2.3095	0.8634	0.5602	-0.0403	-0.5700	4.7900
ROA	1.2785	1.1908	105.6322	-8.2542	-13.5200	5.1000
LNTA	25.1183	0.7534	-0.7540	-0.2790	23.1276	26.4313
LDR	83.2716	9.6307	0.3619	-0.2697	56.2221	107.7848
CAR	10.7829	4.1921	50.4211	-6.1029	-29.6660	18.7586
LNGDP	29.4112	0.2062	-1.1629	-0.0172	29.0766	29.7411
INF	7.5497	1.4130	-0.1098	0.6764	5.4235	10.7048
RIR	5.5785	0.5905	0.0282	0.4036	4.6617	6.8859

6.2 Correlation Analysis

In correlation analysis, NIM and ROA have shown positive correlation with INF, LDR, and CAR while negative correlation is observed for LNGDP, RIR, and LNTA. The highest positive correlation of NIM can be identified with LDR of 0.3419 and the lowest positive with INF of 0.1429. On the other hand, the highest negative correlation of NIM can be identified with RIR of (0.2027) and the lowest negative with LNGDP of (0.0980). For ROA, the highest positive correlation can be found with CAR of 0.6005 and the lowest positive with INF of 0.0582. In contrast, the highest negative correlation of ROA is observed for RIR of (0.1628) and the lowest negative with LNGDP of (0.0287).

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Table 4 – Correlation Analysis

	NIM	ROA	LNGDP	INF	RIR	LNTA	LDR	CAR
NIM	1.0000							
ROA	0.3641	1.0000						
LNGDP	-0.0980	-0.0287	1.0000					
INF	0.1429	0.0582	-0.1397	1.0000				
RIR	-0.2027	-0.1628	0.2137	-0.4584	1.0000			
LNTA	-0.1087	-0.0705	0.9011	-0.1049	0.1602	1.0000		
LDR	0.3419	0.3280	0.0154	0.1222	-0.1621	-0.0803	1.0000	
CAR	0.2202	0.6005	0.1536	-0.0279	0.0541	0.0342	0.2974	1.0000

6.3 Impact of Firm-Specific Attributes and Macroeconomic Conditions on NIM

The summary of regression results of net interest margin (NIM) with firm-specific attributes and macroeconomic conditions variables are depicted in table 5.0. In Breusch and Pagan Lagrangian Multiplier Test, it can be observed that the probability value is lower than 0.05, so the null hypothesis can be rejected, and it can be interpreted that instead of pooled regression model, random effect model is appropriate to study this relationship. On the other hand, in Hausman test, as the probability value is higher than 0.05, it can be concluded that random effect model is appropriate to study this relationship.

Table 5 – Regression Results of Firm-Specific Attributes and Macroeconomic Conditions with NIM

Particulars	Pooled Regression Model		Fixed Effect Model		Random Effect Model	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Constant	20.98733	0.155	5.484652	0.779	9.942897	0.568
Total Assets (LNTA)	.1172218	0.492	-.0638044	0.805	-.0047839	0.983
Loan Deposit Ratio (LDR)	.0248224	0.000	.0402899	0.000	.0378884	0.000
Capital Adequacy Ratio (CAR)	.0352818	0.010	.0084218	0.445	.0102943	0.344
Gross Domestic Product (LNGDP)	-.7912674	0.213	-.1480709	0.866	-.343572	0.660
Inflation (INF)	.0259469	0.540	.0198656	0.500	.0207718	0.481
Real Interest Rate (RIR)	-.178149	0.087	-.1458197	0.048	-.149037	0.042
R-Squared	0.1708		0.1487		0.1528	
F-Statistics (Prob)	0.0000		0.0000		0.0000	
Number of obs	228					
Breusch and Pagan Lagrangian Multiplier(LM) Test	Prob > chibar2 = 0.0000					
Hausman test	Prob>chi2 = 0.4711					

In random effect model, the coefficient of determination, R Squared, is found to be 0.1528 which indicates that 15.28% of the variability of profitability expressed by NIM can be explained by LNTA, LDR, CAR, LNGDP, INF, and RIR. Among these independent variables, LDR, CAR, and INF have shown positive coefficients with NIM while negative

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coefficients are observed for LNTA, LNGDP, and RIR. But, only the coefficients of LDR and RIR are found to be significant at 5% significance level. However, F-Statistics of 0.0000 suggests that the independent variables have combined significant impact on NIM, therefore, it can be interpreted that firm-Specific attributes and macroeconomic conditions have significant impact on NIM.

6.4 Impact of Firm-Specific Attributes and Macroeconomic Indicators on ROA

Table 6.0 shows the summary of regression results of return on assets (ROA) with firm-specific attributes and macroeconomic conditions variables. The probability value of Breusch and Pagan LM Test is lower than 0.05 which suggests that random effect model is appropriate for this study comparing to pooled regression. In addition, the p-value of Hausman test is 0.9912 which is higher than 0.05, therefore, random effect model can be deemed to be appropriate in studying this relationship.

In random effect model, the coefficient of determination, R Squared, is found to be 0.4251 which indicates that 42.51% of the variability of profitability expressed by ROA can be explained by LNTA, LDR, CAR, LNGDP, INF, and RIR. Among the independent variables, LNTA, LDR, CAR, and INF have shown positive coefficients with ROA while negative coefficients are observed for LNGDP and RIR. But, at 5% significance level, only the coefficients of LDR, CAR, and RIR are found significant. However, F-Statistics of 0.0000 suggests that the independent variables have combined significant impact on ROA, therefore, the existence of significant impact of firm-Specific attributes and macroeconomic conditions on ROA can be concluded.

Table 6 – Regression Results of Firm-Specific Attributes and Macroeconomic Conditions with ROA

Particulars	Pooled Regression Model		Fixed Effect Model		Random Effect Model	
	Coefficients	P-value	Coefficients	P-value	Coefficients	P-value
Constant	32.25484	0.057	22.97505	0.485	32.25484	0.056
Total Assets (LNTA)	.2294624	0.241	.0999398	0.819	.2294624	0.240
Loan Deposit Ratio (LDR)	.0177707	0.010	.0253868	0.022	.0177707	0.009
Capital Adequacy Ratio (CAR)	.1690664	0.000	.1718082	0.000	.1690664	0.000
Gross Domestic Product (LNGDP)	-1.29368	0.077	-.8915013	0.548	-1.29368	0.075
Inflation (INF)	-.0267254	0.582	.0297896	0.548	.0267254	0.582
Real Interest Rate (RIR)	-.3214004	0.008	-.3099045	0.013	-.3214004	0.007
R-Squared	0.4251		0.4211		0.4251	
F-Statistics (Prob)	0.0000		0.0000		0.0000	
Number of obs	228					
Breusch and Pagan Lagrangian Multiplier (LM) Test	Prob > chibar2 = 0.0000					
Hausman test	P-value = 0.9912					

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6.5 Diagnostic Test

The result of Breusch-Pagan / Cook-Weisberg test for heteroskedasticity is given in Table 7.0 Result shows that there is no heteroskedasticity problem in the model as P-Value is less than 0.05 which means dataset in homoscedastic.

Table 7 – Results of Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

chi2(1) = 3.72
Prob > chi2 = 0.0537

6.6 Results of Hypothesis

Based on the random effect regressions findings of the firm-Specific attributes and macroeconomic conditions variables with NIM and ROA, hypothesis H01 and H02 can be rejected and simultaneously hypothesis HA1 and HA2 can be accepted. Therefore, it can be reasoned that there is a significant effect of firm-Specific characteristics and macroeconomic conditions on profitability expressed by NIM and ROA in the Banking Sector of Bangladesh.

Table 8 – Results of Hypothesis Testing

Hypothesis		Basis	Result
H_{01}:	There is no significant effect of firm-Oriented variables and macroeconomic predictors on NIM in Banking Sector of Bangladesh	Random Effect Model	Rejected
H_{A1}:	There is significant effect of firm-Oriented variables and macroeconomic predictors on NIM in Banking Sector of Bangladesh		Accepted
H_{02}:	There is no significant effect of firm-Oriented variables and macroeconomic predictors on ROA in Banking Sector of Bangladesh	Random Effect Model	Rejected
H_{A2}:	There is significant effect of firm-Oriented variables and macroeconomic predictors on ROA in Banking Sector of Bangladesh		Accepted

6. Conclusion

This study is intended to investigate the effect of firm-specific predictors and macroeconomic conditions on performance in the banking sector of Bangladesh by considering 19 DSE listed commercial banks for 2004 to 2015. From relevant analysis, the existence of significant impact of firm-specific attributes and macroeconomic conditions on profitability is identified which is consistent with the findings of Almaqtari et al., (2018). Among the variables, loan deposit ratio has shown significant positive impact and real interest rate has shown a negative and significant impact on both the performance measures. On the other hand, capital adequacy ratio (CAR) has shown a positive and significant impact only on ROA. So, it can be stated that banking sector of Bangladesh can be benefitted by the increase of loan-deposit ratio and capital adequacy ratio and by the decrease of real interest rate. In conclusion, in this study only 19 conventional banks have been incorporated. Future research on this topic can be carried out by considering all banks operating in Bangladesh. Additionally, this impact can also be investigated for other sectors of Bangladesh.

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