
Bank-specific & Macroeconomic Determinants of Profitability: Empirical Evidence from Bangladeshi Private Commercial Banks

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Abstract: This paper tries to investigate the determinants of profitability for Bangladeshi private commercial banks. The return on assets (ROA) and return on equity (ROE) are two important variables that have been used in this study to indicate profitability. The study considered a set of independent variables such as bank-specific factors that comprise bank size, capital adequacy, asset quality, liquidity, deposits, asset management, operational efficiency; and macroeconomic factors such as GDP growth rate, inflation rate, interest rate and exchange rate. The data for 25 private commercial banks from Bangladesh over the period of 2012 to 2019 have been analyzed. Overall, the findings are satisfactory. The capital adequacy ratio, asset management ratio and GDP growth rate are found to have significant positive impact on ROA and ROE of the private commercial banks in Bangladesh. The asset quality, liquidity and deposit ratios also have a significant positive impact on ROE; and an insignificant positive impact on ROA. The cost to income ratio and bank size both have a negative association with ROA and ROE. These imply some sort of scale inefficiencies and problems in minimizing costs associated with increasing equity. The conclusion prioritizes that the financial sector authority in Bangladesh should continue their current role towards having a sustainable banking industry and thus having the economic growth, welfare and prosperity of the nation.

Keywords: Commercial Banks, Profitability, Bangladesh, Private Commercial Banks

1. Introduction

Financial institutions are recognized as the lifeblood of any economy. The main activity of a financial system is to facilitate the flow of funds from the lenders to the borrowers [1]. An efficient financial system needs to ensure profitability improvements, better consumer service and sufficient fund allocation for lending to the borrowers [2].

Like most developing countries, the financial sector of Bangladesh is dominated by the banking industry [3]. For the expansion of the economy and financial system of the country, banking institutions have been playing a significant role in Bangladesh. But it is worth mentioning that the banking industry in developing countries is less stable than the developed ones [4].

As the supreme authority of all the banks in Bangladesh, the Bangladesh Bank regulates the banking industry in order to

stabilize the financial market and achieve efficient growth. Unfortunately, there are not enough and detailed recent studies about the performance of Bangladeshi banks. Some of the authors found to be analyzing about Bangladeshi banks are Sufian and Habibullah, 2009 [1]; Rahman et al., 2015 [4]; A. Islam et al., 2017 [3]; Robin et al., 2018 [5] and Bose et al., 2017 [6] in recent past. Thus, it is still worth to analyze the key factors and the financial ratios that affect the performance of the banking industry in Bangladesh. Therefore, this study tries to investigate the impact of the bank-specific and macroeconomic factors on the profitability of the private commercial banks in Bangladesh.

2. Literature Review

There are many prior studies about the determinants of

profitability for the banks throughout the globe. In this study, the literature over the period of recent 5 years (2016-2020) has been studied and summarized as below:

Table 1. Literature Review at a Glimpse.

S/N	Prior Study	Dependent Variables	Sample	Period	Country/Region
1	Hasan et al., 2020 [7]	ROA, ROE	26	2007-2018	Indonesia
2	T. D. Le & Ngo, 2020 [8]	ROA		2002-2016	23 countries
3	Abate & Mesfin, 2019 [9]	ROA	9	2007-2016	Ethiopia
4	Batten & Vo, 2019 [10]	ROA, ROE	35	2006-2014	Vietnam
5	Bongini et al., 2019 [11]	ROA	109	2006-2016	Europe
6	Haris et al., 2019 [12]	ROA, ROE	26	2021-2016	Pakistan
7	Al-Homaidi et al., 2018 [2]	ROA, ROE	69	2008-2017	India
8	Almaqtari et al., 2018 [13]	ROA, ROE	69	2008-2017	India
9	de Mendonça & Silva, 2018 [14]	ROA	18	2011-2015	Brazil
10	Kassem & Sakr, 2018 [15]	ROA, ROE	19	2007-2016	Egypt
11	Robin et al., 2018 [5]	ROA, ROE	12	1983-2021	Bangladesh
12	Sahyouni & Wang, 2018 [16]	ROA, ROE	4995	2011-2015	11 countries
13	Saima & Alalawi, 2018 [17]	ROA, ROE	10	2000-2013	Saudi Arabia
14	Yao et al., 2018 [18]	ROA, ROE	28	2007-2016	Pakistan
15	Yüksel et al., 2018 [19]	ROE	13	1996-2016	13 countries
16	A. Islam et al., 2017 [3]	ROE	11	2014-2015	Bangladesh
17	Ahamed, 2017 [20]	ROA	107	1998-2014	India
18	Alharbi, 2017 [21]	ROA	110	1992-2008	25 countries
19	Bapat, 2017 [22]	ROA, ROE	25	2006-2007, 2012-2013	India
20	Bojare & Romanova, 2017 [23]	ROE	17	2005-2016	Latvia
21	Bose et al., 2017 [6]	ROE	30	2009-2014	Bangladesh
22	Bougatef, 2017 [24]	ROA, ROE	10	2003-2014	Tunisia
23	Bouzgarrou et al., 2017 [25]	ROA, ROE	170	2000-2012	France
24	Bucevska & Misheva, 2017 [26]	ROA	127	2005-2009	6 countries
25	Chowdhury & Rashid, 2017 [27]	ROA	29	2005-2013	6 countries
26	Ebenezer et al., 2017 [28]	ROA, ROE	16	2010-2015	Nigeria
27	Yigermal, 2017 [29]	ROA, ROE	7	2005-2014	Ethiopia
28	Hirindukawshala, 2017 [30]	ROA	12	2011-2015	Sri Lanka
29	Mehta & Bhavani, 2017 [31]	ROA, ROE	19	2006-2013	UAE
30	Salike & Ao, 2017 [32]	ROA	947	2001-2015	12 countries
31	Shah & Khan, 2017 [33]	ROA	14	2007-2014	Pakistan
32	Tan et al., 2017 [34]	ROA, ROE	100	2003-2013	China
33	Topak & Talu, 2017 [35]	ROA, ROE	10	2005-2015	Turkey
34	Vinh, 2017 [36]	ROA	34	2005-2015	Vietnam
35	Zampara et al., 2017 [37]	ROA, ROE		2001-2014	Greece
36	Abel & Roux, 2016 [38]	ROA, ROE	18	2009-2014	Zimbabwe
37	Alshatti, 2016 [39]	ROA, ROE	13	2005-2014	Jordan
38	Djalilov & Piesse, 2016 [40]	ROA	275	2000-2013	16 countries
39	Fidasoski et al., 2016 [41]	ROA		2007-2014	Croatia
40	Garcia & Guerreiro, 2016 [42]	ROA, ROE	27	2002-2011	Portugal
41	Kapaya & Raphael, 2016 [43]	ROA, ROE	52	1998-2010	Tanzania
42	M. S. Islam & Nishiyama, 2016 [44]	ROA, ROE	259	1997-2021	4 countries
43	Menicucci & Paolucci, 2016 [45]	ROA, ROE	35	2009-2013	Europe
44	Narwal & Pathneja, 2016 [46]	ROA	46	2004-2005, 2013-2014	India
45	Ozili, 2016 [47]	ROA	200	2004-2013	Africa
46	Ramlan & Adnan, 2016 [48]	ROA, ROE	5	2006-2011	Malaysia
47	T. Le, 2016 [49]	ROA	40	2005-2015	Vietnam
48	Tan, 2016 [50]	ROA, ROE	41	2003-2011	China

3. Methodology

A. Data and Sample

There are 61 scheduled banks in Bangladesh right now. Among those, there are 6 state-owned commercial banks

(SOCBs), 3 specialized banks (SDBs), 43 private commercial banks (PCBs), and 9 foreign commercial banks (FCBs) [51]. The initial sample was consisted of 43 private commercial banks in Bangladesh. Of those, 18 banks were excluded from the sample as few were relatively new to get the historic data and some banks' data were unavailable. Therefore, the final sample consists

of 25 private commercial banks in Bangladesh and these are:

Table 2. The Sampled Banks.

1. AB Bank	8. EXIM Bank	14. National Bank	20. Shahjalal Islami Bank
2. Al-Arafah Islami Bank	9. First Security Islami Bank	15. NCC Bank	21. Southeast Bank
3. Bank Asia	10. Islami Bank Bangladesh	16. One Bank	22. Standard Bank
4. City Bank	11. ICB Islami Bank	17. Premier Bank	23. Trust Bank
5. Dutch-Bangla Bank	12. IFIC Bank	18. Prime Bank	24. United Commercial Bank
6. Dhaka Bank	13. Mercantile Bank	19. Social Islami Bank	25. Uttara Bank
7. Eastern Bank			

The data for bank-specific variables were obtained from the balance sheets and the income statements of the respective banks over the period of 2012 to 2019. The data for macroeconomic variables were collected from the World Bank website [52].

B. Variables

The independent variables used in this study with their impact on respective dependent variables that have been derived from prior evidences are described as under:

Table 3. The Variables with Prior Evidences.

S/N	Impact on Dependent Variable	Independent Variables with Evidences from Prior Studies
Bank-specific Independent Variables		
1	<i>SIZE (Natural Logarithm of Total Assets)</i>	
	(+) ROA	Bongini et al., 2019 [11]; Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Kassem & Sakr, 2018 [15]; Sahyouni & Wang, 2018 [16]; Saima & Alalawi, 2018 [17]; Robin et al., 2018 [5]; Ahamed, 2017 [20]; Bucevska & Misheva, 2017 [26]; Chowdhury & Rashid, 2017 [27]; Yigermal, 2017 [29]; Hirindukawshala, 2017 [30]; Shah & Khan, 2017 [33]; Tan et al., 2017 [34]; Fidanoski et al., 2016 [41]; Kapaya & Raphael, 2016 [43]; M. S. Islam & Nishiyama, 2016 [44]; Narwal & Pathneja, 2016 [46]; Ozili, 2016 [47].
	(-) ROA	Abate & Mesfin, 2019 [9]; Batten & Vo, 2019 [10]; Haris et al., 2019 [12]; Yao et al., 2018 [18]; Bapat, 2017 [22]; Bougatef, 2017 [24]; Bouzgarrou et al., 2017 [25]; Ebenezer et al., 2017 [28]; Mehta & Bhavani, 2017 [31]; Vinh, 2017 [36]; Abel & Roux, 2016 [38]; Alshatti, 2016 [39]; Djalilov & Piesse, 2016 [40]; T. Le, 2016 [49]; Tan, 2016 [50].
	(+) ROE	Haris et al., 2019 [12]; Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Kassem & Sakr, 2018 [15]; Sahyouni & Wang, 2018 [16]; Saima & Alalawi, 2018 [17]; Robin et al., 2018 [5]; Bojare & Romanova, 2017 [23]; Bougatef, 2017 [24]; Ebenezer et al., 2017 [28]; Yigermal, 2017 [29]; Mehta & Bhavani, 2017 [31]; Tan et al., 2017 [34]; Kapaya & Raphael, 2016 [43]; M. S. Islam & Nishiyama, 2016 [44]; Tan, 2016 [50].
	(-) ROE	Batten & Vo, 2019 [10]; Yao et al., 2018 [18]; Yüksel et al., 2018 [19]; A. Islam et al., 2017 [3]; Bapat, 2017 [22]; Bose et al., 2017 [6]; Bouzgarrou et al., 2017 [25]; Abel & Roux, 2016 [38]; Alshatti, 2016 [39].
2	<i>CAR (Total Equity/Total Assets)</i>	
	(+) ROA	Abate & Mesfin, 2019 [9]; Batten & Vo, 2019 [10]; Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Kassem & Sakr, 2018 [15]; Sahyouni & Wang, 2018 [16]; Saima & Alalawi, 2018 [17]; Robin et al., 2018 [5]; Ahamed, 2017 [20]; Alharbi, 2017 [21]; Bougatef, 2017 [24]; Bouzgarrou et al., 2017 [25]; Chowdhury & Rashid, 2017 [27]; Hirindukawshala, 2017 [30]; Salike & Ao, 2017 [32]; Shah & Khan, 2017 [33]; Vinh, 2017 [36]; Alshatti, 2016 [39]; Djalilov & Piesse, 2016 [40]; M. S. Islam & Nishiyama, 2016 [44]; Menicucci & Paolucci, 2016 [45]; Tan, 2016 [50].
	(-) ROA	Hasan et al., 2020 [7]; Ebenezer et al., 2017 [28]; Abel & Roux, 2016 [38]; Garcia & Guerreiro, 2016 [42]; Kapaya & Raphael, 2016 [43]; Ramlan & Adnan, 2016 [48]; T. Le, 2016 [49].
	(+) ROE	Hasan et al., 2020 [7]; Almaqtari et al., 2018 [13]; Sahyouni & Wang, 2018 [16]; Saima & Alalawi, 2018 [17]; A. Islam et al., 2017 [3]; Bougatef, 2017 [24]; Ebenezer et al., 2017 [28]; Abel & Roux, 2016 [38]; Alshatti, 2016 [39]; Menicucci & Paolucci, 2016 [45]; Tan, 2016 [50].
	(-) ROE	Batten & Vo, 2019 [10]; Al-Homaidi et al., 2018 [2]; Kassem & Sakr, 2018 [15]; Yüksel et al., 2018 [19]; Robin et al., 2018 [5]; Bouzgarrou et al., 2017 [25]; Garcia & Guerreiro, 2016 [42]; Kapaya & Raphael, 2016 [43]; M. S. Islam & Nishiyama, 2016 [44]; Ramlan & Adnan, 2016 [48].
3	<i>AQ (Total Loans/Total Assets)</i>	
	(+) ROA	Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Kassem & Sakr, 2018 [15]; Robin et al., 2018 [5]; Ahamed, 2017 [20]; Chowdhury & Rashid, 2017 [27]; Fidanoski et al., 2016 [41]; Menicucci & Paolucci, 2016 [45]; Ramlan & Adnan, 2016 [48]; T. Le, 2016 [49]; Tan, 2016 [50].
	(-) ROA	Alharbi, 2017 [21]; Ebenezer et al., 2017 [28]; Shah & Khan, 2017 [33]; Alshatti, 2016 [39]; Ozili, 2016 [47].
	(+) ROE	Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Robin et al., 2018 [5]; Ebenezer et al., 2017 [28]; Alshatti, 2016 [39]; Menicucci & Paolucci, 2016 [45]; Ramlan & Adnan, 2016 [48]; Tan, 2016 [50].
	(-) ROE	Kassem & Sakr, 2018 [15]; Bojare & Romanova, 2017 [23].
4	<i>LIQ (Liquid Assets/Total Assets)</i>	
	(+) ROA	Abate & Mesfin, 2019 [9]; Almaqtari et al., 2018 [13]; Fidanoski et al., 2016 [41]; Kapaya & Raphael, 2016 [43]; T. Le, 2016 [49].
	(-) ROA	Al-Homaidi et al., 2018 [2]; Saima & Alalawi, 2018 [17]; Ebenezer et al., 2017 [28]; Hirindukawshala, 2017 [30]; Tan et al., 2017 [34]; Alshatti, 2016 [39].
	(+) ROE	Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Ebenezer et al., 2017 [28]; Tan et al., 2017 [34].
	(-) ROE	Saima & Alalawi, 2018 [17]; Alshatti, 2016 [39]; Kapaya & Raphael, 2016 [43].
5	<i>DEP (Total Deposits/Total Assets)</i>	
	(+) ROA	Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Kassem & Sakr, 2018 [15]; Alharbi, 2017 [21]; Ebenezer et al., 2017 [28];

S/N	Impact on Dependent Variable	Independent Variables with Evidences from Prior Studies
	(-) ROA	[28]; Hirindukawshala, 2017 [30]; Shah & Khan, 2017 [33]; Kapaya & Raphael, 2016 [43]; Menicucci & Paolucci, 2016 [45]; Ramlan & Adnan, 2016 [48].
	(+) ROE	Sahyouni & Wang, 2018 [16]; de Mendonça & Silva, 2018 [14].
	(-) ROE	Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Sahyouni & Wang, 2018 [16]; A. Islam et al., 2017 [3]; Ebenezer et al., 2017 [28]; Menicucci & Paolucci, 2016 [45]; Ramlan & Adnan, 2016 [48].
	(-) ROE	Kassem & Sakr, 2018 [15]; Kapaya & Raphael, 2016 [43].
6	<i>AM (Total Operating Income/Total Assets)</i>	
	(+) ROA	Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Sahyouni & Wang, 2018 [16].
	(+) ROE	Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Sahyouni & Wang, 2018 [16].
7	<i>CIR (Total Operating Expenses/Total Operating Income)</i>	
	(+) ROA	Almaqtari et al., 2018 [13]; Alharbi, 2017 [21].
	(-) ROA	Al-Homaidi et al., 2018 [2]; Ebenezer et al., 2017 [28]; Abel & Roux, 2016 [38].
	(+) ROE	Almaqtari et al., 2018 [13].
	(-) ROE	Al-Homaidi et al., 2018 [2]; Ebenezer et al., 2017 [28]; Abel & Roux, 2016 [38].
Macroeconomic Independent Variables		
8	<i>GDP (Annual GDP Growth Rate)</i>	
	(+) ROA	T. D. Le & Ngo, 2020 [8]; Batten & Vo, 2019 [10]; Bongini et al., 2019 [11]; Haris et al., 2019 [12]; Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Sahyouni & Wang, 2018 [16]; Yao et al., 2018 [18]; de Mendonça & Silva, 2018 [14]; Alharbi, 2017 [21]; Bouzgarrou et al., 2017 [25]; Bucevska & Misheva, 2017 [26]; Chowdhury & Rashid, 2017 [27]; Ebenezer et al., 2017 [28]; Yigermal, 2017 [29]; Mehta & Bhavani, 2017 [31]; Salike & Ao, 2017 [32]; Topak & Talu, 2017 [35]; Vinh, 2017 [36]; Zampara et al., 2017 [37]; Djalilov & Piesse, 2016 [40]; Fidoski et al., 2016 [41]; Garcia & Guerreiro, 2016 [42]; Ozili, 2016 [47]; T. Le, 2016 [49].
	(-) ROA	Abate & Mesfin, 2019 [9]; Saima & Alalawi, 2018 [17]; Robin et al., 2018 [5]; Bapat, 2017 [22]; Tan et al., 2017 [34]; Abel & Roux, 2016 [38]; M. S. Islam & Nishiyama, 2016 [44]; Tan, 2016 [50].
	(+) ROE	Batten & Vo, 2019 [10]; Haris et al., 2019 [12]; Al-Homaidi et al., 2018 [2]; Sahyouni & Wang, 2018 [16]; Yao et al., 2018 [18]; Yüksel et al., 2018 [19]; Robin et al., 2018 [5]; Bapat, 2017 [22]; Bojare & Romanova, 2017 [23]; Ebenezer et al., 2017 [28]; Yigermal, 2017 [29]; Mehta & Bhavani, 2017 [31]; Tan et al., 2017 [34]; Topak & Talu, 2017 [35]; Zampara et al., 2017 [37]; Tan, 2016 [50].
	(-) ROE	Almaqtari et al., 2018 [13]; Saima & Alalawi, 2018 [17]; Bouzgarrou et al., 2017 [25]; Abel & Roux, 2016 [38]; Garcia & Guerreiro, 2016 [42]; M. S. Islam & Nishiyama, 2016 [44].
9	<i>INF (Annual Inflation Rate)</i>	
	(+) ROA	Al-Homaidi et al., 2018 [2]; Sahyouni & Wang, 2018 [16]; Robin et al., 2018 [5]; Bapat, 2017 [22]; Bucevska & Misheva, 2017 [26]; Yigermal, 2017 [29]; Mehta & Bhavani, 2017 [31]; Tan et al., 2017 [34]; Vinh, 2017 [36]; M. S. Islam & Nishiyama, 2016 [44]; Tan, 2016 [50].
	(-) ROA	T. D. Le & Ngo, 2020 [8]; Abate & Mesfin, 2019 [9]; Batten & Vo, 2019 [10]; Almaqtari et al., 2018 [13]; Saima & Alalawi, 2018 [17]; Yao et al., 2018 [18]; Bouzgarrou et al., 2017 [25]; Chowdhury & Rashid, 2017 [27]; Salike & Ao, 2017 [32]; Abel & Roux, 2016 [38]; Djalilov & Piesse, 2016 [40]; Fidoski et al., 2016 [41]; Kapaya & Raphael, 2016 [43]; T. Le, 2016 [49].
	(+) ROE	Batten & Vo, 2019 [10]; Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Sahyouni & Wang, 2018 [16]; Yüksel et al., 2018 [19]; Robin et al., 2018 [5]; Bapat, 2017 [22]; Bojare & Romanova, 2017 [23]; Ebenezer et al., 2017 [28]; Yigermal, 2017 [29]; Mehta & Bhavani, 2017 [31]; Tan et al., 2017 [34]; Kapaya & Raphael, 2016 [43]; Tan, 2016 [50].
	(-) ROE	Saima & Alalawi, 2018 [17]; Yao et al., 2018 [18]; Bouzgarrou et al., 2017 [25]; Abel & Roux, 2016 [38]; M. S. Islam & Nishiyama, 2016 [44].
10	<i>EXCH (Average Annual Exchange Rate)</i>	
	(+) ROA	de Mendonça & Silva, 2018 [14]; Fidoski et al., 2016 [41].
	(-) ROA	Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Topak & Talu, 2017 [35].
	(-) ROE	Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Topak & Talu, 2017 [35].
11	<i>INTRT (Average Annual Lending Interest Rate)</i>	
	(+) ROA	de Mendonça & Silva, 2018 [14]; Topak & Talu, 2017 [35].
	(-) ROA	Abate & Mesfin, 2019 [9]; Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Alharbi, 2017 [21].
	(+) ROE	Topak & Talu, 2017 [35].
	(-) ROE	Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13].

C. Model Specification

Following the variables described above, the ROA and ROE are the dependent variables. The independent variables are categorized into two types – bank-specific and macroeconomic variables. The bank-specific independent variables used in this study are SIZE, CAR, AQ, LIQ, DEP, AM and CIR. The macroeconomic independent variables used in this study are GDP, INF, EXCH and INTRT. Two models are used in this study and these are:

$$ROA_{it} = \alpha_i + \beta_1 SIZE_{it} + \beta_2 CAR_{it} + \beta_3 AQ_{it} + \beta_4 LIQ_{it} + \beta_5 DEP_{it} + \beta_6 AM_{it} + \beta_7 CIR_{it} + \beta_8 GDP_{it} + \beta_9 INF_{it} + \beta_{10} EXCH_{it} + \beta_{11} INTRT_{it} + \varepsilon_{it} \quad (1)$$

$$ROE_{it} = \alpha_i + \beta_1 SIZE_{it} + \beta_2 CAR_{it} + \beta_3 AQ_{it} + \beta_4 LIQ_{it} + \beta_5 DEP_{it} + \beta_6 AM_{it} + \beta_7 CIR_{it} + \beta_8 GDP_{it} + \beta_9 INF_{it} + \beta_{10} EXCH_{it} + \beta_{11} INTRT_{it} + \varepsilon_{it} \quad (2)$$

Where i refers to an individual bank, t refers to year, β_1 to β_{11} are the coefficients of the independent determinant variables that are described in table 3 above and ε is the error term.

4. Findings

Table 4. Summary Statistics.

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
ROA	0.6990	0.8510	1.8218	-6.9826	0.9929	-4.7803	30.0159
ROE	10.9397	10.5336	21.3175	0.0809	3.8347	-0.1591	3.2115
SIZE	11.3022	11.3435	12.0575	10.0508	0.3123	-1.9486	9.4996
CAR	4.3884	7.7329	13.7968	-101.1942	17.4907	-4.8133	25.1153
AQ	69.4210	69.7060	83.9362	48.9705	6.0391	-0.6705	4.1192
LIQ	11.8768	11.0452	27.2659	5.7452	4.1791	1.1263	4.3467
DEP	79.4458	79.9500	106.4078	62.3731	5.8422	0.2288	5.9158
AM	4.3721	4.3663	7.2456	-0.2380	1.0972	-0.7745	5.9163
CIR	34.7508	46.7539	621.2975	-2039.4550	199.7888	-8.9502	89.6700
GDP	6.9454	6.8330	8.1530	6.0140	0.7459	0.2863	1.7430
INF	6.1608	5.9480	7.5300	5.5140	0.7002	0.8643	2.3430
EXCH	80.2975	79.4530	84.4540	77.6410	2.5196	0.4648	1.6292
INTRT	4.8709	5.1110	6.8860	3.0690	1.2420	0.0084	1.8057

Note: Total number of observations is 200. Here, ROA=Return on Assets (%), ROE=Return on Shareholders' Equity (%), SIZE=Natural Logarithm of Total Assets, CAR=Capital Adequacy Ratio (%), AQ=Total Loans/Total Assets (%), LIQ=Liquid Assets/Total Assets (%), DEP=Total Deposits/Total Assets (%), AM=Total Operating Income/Total Assets (%), CIR=Total Operating Expenses/Total Operating Income (%), GDP=Annual GDP Growth Rate (%), INF=Annual Inflation Rate (%), EXCH=Average Annual Exchange Rate, INTRT= Average Annual Lending Interest Rate (%).

Table 5. Correlation Matrix.

	ROA	ROE	SIZE	CAR	AQ	LIQ	DEP	AM	CIR	GDP	INF	EXCH	INTRT
ROA	1.00												
ROE	0.47	1.00											
SIZE	0.62	0.15	1.00										
CAR	0.86	0.33	0.75	1.00									
AQ	-0.18	-0.06	0.20	-0.16	1.00								
LIQ	-0.10	0.17	-0.18	-0.14	-0.19	1.00							
DEP	-0.39	-0.07	-0.37	-0.49	0.18	0.11	1.00						
AM	0.59	0.49	0.29	0.60	-0.53	0.06	-0.51	1.00					
CIR	0.33	0.11	0.26	0.41	-0.08	0.04	-0.33	0.32	1.00				
GDP	-0.12	-0.14	0.35	-0.07	0.44	-0.19	-0.17	-0.30	-0.13	1.00			
INF	0.08	0.09	-0.29	0.06	-0.38	0.12	0.18	0.24	0.07	-0.86	1.00		
EXCH	-0.14	-0.12	0.22	-0.05	0.31	-0.11	-0.13	-0.19	-0.15	0.82	-0.60	1.00	
INTRT	0.08	0.08	-0.24	0.05	-0.36	0.10	0.16	0.23	0.02	-0.69	0.81	-0.38	1.00

Table 6. Model Estimation.

Model	ROA		ROE	
Variable	Coefficient	Prob.	Coefficient	Prob.
Intercept	6.724615	0.0375**	32.39563	0.0986*
Bank-specific Variables				
SIZE	-0.286368	0.2374	-4.682237	0.0017***
CAR	0.050618	0.0000***	0.093873	0.0008***
AQ	0.006042	0.4456	0.248800	0.0000***
LIQ	0.002567	0.7735	0.183146	0.0009***
DEP	0.012235	0.1319	0.204919	0.0000***
AM	0.149067	0.0050***	2.744245	0.0000***
CIR	-0.000203	0.3122	-0.001480	0.2255
Macroeconomic Variables				
GDP	0.299345	0.0788*	2.102156	0.0427**
INF	-0.055999	0.6530	-0.006196	0.9935
EXCH	-0.088723	0.0030***	-0.395981	0.0283**
INTRT	0.064132	0.2130	0.125628	0.6878
	R-squared	0.767359	R-squared	0.423125
	Adjusted R-squared	0.753747	Adjusted R-squared	0.389372
	Durbin-Watson stat	0.728122	Durbin-Watson stat	0.981722
	F-statistic	56.37388	F-statistic	12.53580
	Prob. (F-statistic)	0.000000	Prob. (F-statistic)	0.000000

Note: Significance is at ***=1%, **=5% and *=10% level.

As shown in table 6, among the bank-specific variables, CAR and AM both have significant positive impact on ROA (p-value=0.00<0.01); while among the macroeconomic variables, GDP has a significant positive and EXCH has a

significant negative impact on ROA (p-value=0.08<0.10 and 0.00<0.01 respectively).

Among prior studies, Abate & Mesfin, 2019 [9]; Batten & Vo, 2019 [10]; Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Kassem & Sakr, 2018 [15]; Sahyouni & Wang, 2018 [16]; Saima & Alalawi, 2018 [17]; Robin et al., 2018 [5]; Ahamed, 2017 [20]; Alharbi, 2017 [21]; Bougatef, 2017 [24]; Bouzgarrou et al., 2017 [25]; Chowdhury & Rashid, 2017 [27]; Hirindukawshala, 2017 [30]; Salike & Ao, 2017 [32]; Shah & Khan, 2017 [33]; Vinh, 2017 [36]; Alshatti, 2016 [39]; Djalilov & Piesse, 2016 [40]; M. S. Islam & Nishiyama, 2016 [44]; Menicucci & Paolucci, 2016 [45] and Tan, 2016 [50] also found a positive impact of CAR on ROA; while Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13] and Sahyouni & Wang, 2018 [16] found a positive impact of AM on ROA.

In respect to macroeconomic variables, the results about the impact of GDP and EXCH found in this study is also supported by previous literature. T. D. Le & Ngo, 2020 [8]; Batten & Vo, 2019 [10]; Bongini et al., 2019 [11]; Haris et al., 2019 [12]; Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Sahyouni & Wang, 2018 [16]; Yao et al., 2018 [18]; de Mendonça & Silva, 2018 [14]; Alharbi, 2017 [21]; Bouzgarrou et al., 2017 [25]; Bucevska & Misheva, 2017 [26]; Chowdhury & Rashid, 2017 [27]; Ebenezer et al., 2017 [28]; Yigermal, 2017 [29]; Mehta & Bhavani, 2017 [31]; Salike & Ao, 2017 [32]; Topak & Talu, 2017 [35]; Vinh, 2017 [36]; Zampara et al., 2017 [37]; Djalilov & Piesse, 2016 [40]; Fidanowski et al., 2016 [41]; Garcia & Guerreiro, 2016 [42]; Ozili, 2016 [47] and T. Le, 2016 [49] found a positive impact of GDP on ROA. Meanwhile, Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13] and Topak & Talu, 2017 [35] found that EXCH has a negative impact on ROA.

Concerning the impact of bank-specific variables on ROE, the study reveals that the SIZE has a significant negative impact on ROE (p-value=0.00<0.01). A similar result was found by Batten & Vo, 2019 [10]; Yao et al., 2018 [18]; Yüksel et al., 2018 [19]; A. Islam et al., 2017 [3]; Bapat, 2017 [22]; Bose et al., 2017 [6]; Bouzgarrou et al., 2017 [25]; Abel & Roux, 2016 [38]; Alshatti, 2016 [39]. However, this study reveals that CAR, AQ, LIQ, DEP and AM have significant positive impact on ROE (p-value=0.00<0.01). These results are supported by previous studies too. Hasan et al., 2020 [7]; Almaqtari et al., 2018 [13]; Sahyouni & Wang, 2018 [16]; Saima & Alalawi, 2018 [17]; A. Islam et al., 2017 [3]; Bougatef, 2017 [24]; Ebenezer et al., 2017 [28]; Abel & Roux, 2016 [38]; Alshatti, 2016 [39]; Menicucci & Paolucci, 2016 [45] and Tan, 2016 [50] found CAR has a positive impact on ROE while Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Robin et al., 2018 [5]; Ebenezer et al., 2017 [28]; Alshatti, 2016 [39]; Menicucci & Paolucci, 2016 [45]; Ramlan & Adnan, 2016 [48] and Tan, 2016 [50] found AQ has a positive impact on ROE. Similarly, Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13]; Ebenezer et al., 2017 [28] and Tan et al., 2017 [34] found that LIQ has a positive impact on ROE. Also, Al-Homaidi et al., 2018 [2]; Almaqtari

et al., 2018 [13]; Sahyouni & Wang, 2018 [16]; A. Islam et al., 2017 [3]; Ebenezer et al., 2017 [28]; Menicucci & Paolucci, 2016 [45] and Ramlan & Adnan, 2016 [48] found that DEP has a positive impact on ROE while Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13] and Sahyouni & Wang, 2018 [16] found that AM has a positive impact on ROE.

About the impact of the macroeconomic variables on ROE, the result reveals that only GDP and EXCH have a significant impact on ROE. However, the impact of GDP on ROE is positive (p-value=0.04<0.05) while the impact of EXCH on ROE is negative (p-value=0.03<0.05). Previous studies like Batten & Vo, 2019 [10]; Haris et al., 2019 [12]; Al-Homaidi et al., 2018 [2]; Sahyouni & Wang, 2018 [16]; Yao et al., 2018 [18]; Yüksel et al., 2018 [19]; Robin et al., 2018 [5]; Bapat, 2017 [22]; Bojare & Romanova, 2017 [23]; Ebenezer et al., 2017 [28]; Yigermal, 2017 [29]; Mehta & Bhavani, 2017 [31]; Tan et al., 2017 [34]; Topak & Talu, 2017 [35]; Zampara et al., 2017 [37] and Tan, 2016 [50] found that GDP has a positive impact on ROE while Al-Homaidi et al., 2018 [2]; Almaqtari et al., 2018 [13] and Topak & Talu, 2017 [35] found that EXCH has a negative impact on ROE.

5. Recommendations & Conclusion

A. Recommendations

In a glimpse, the specific recommendations are the followings:

- The bank size is found to have a significant negative association with ROE. This indicates that an increase in the bank size leads to management inefficiency and ultimate control to the CEO [10]. Large banks also find problems in reducing costs as the number of bank branches increases which leads to scale inefficiencies [18]. So, it needs to have an emphasized focus on it.
- The cost to income ratio is found to be negative in comparison with ROA and ROE though it is not significant. Banks usually try to manage their expenses for having an improvement in this ratio [38]. The Bangladeshi private commercial banks also need to manage their expenses effectively as the results suggest.
- Overall, the capital adequacy ratio, asset management ratio and GDP growth rate are significantly having a positive impact on the ROA and ROE of the Bangladeshi private commercial banks. The asset quality ratio, liquidity ratio and deposit ratio are also having a significant positive impact on ROE. However, these ratios have a positive impact on ROA too, but insignificant indeed. These results imply that the banking sector authority should keep up continuing their current rules and regulations to have a more consistent and sustainable positive impact on the profitability of the banking sector in Bangladesh.

B. Conclusion

This paper tries to investigate the determinants of profitability for private commercial banks in Bangladesh. The return on assets (ROA) and return on equity (ROE) are two

important dependent variables that have been used in this study to indicate profitability. The study considered a set of independent variables such as bank-specific factors that comprise bank size, capital adequacy, asset quality, liquidity, deposits, asset management, operational efficiency; and macroeconomic factors such as GDP growth rate, inflation rate, interest rate and exchange rate. The data for 25 private commercial banks from Bangladesh over the period of 2012 to 2019 have been analyzed.

The findings are satisfactory and indicate a sound financial condition of the private commercial banks in Bangladesh. The capital adequacy ratio, asset management ratio and GDP growth rate are found to have a significant positive impact on ROA and ROE of the private commercial banks in Bangladesh. The asset quality, liquidity and deposit ratios also have a significant positive impact on ROE; and an insignificant positive impact on ROA. The cost to income ratio and bank size both have a negative association with ROA and ROE. These indicate some sort of scale inefficiencies and problems in minimizing expenses associated with increasing equity. It is therefore recommended that the authority should continue their current role in order to have a sustainable banking sector and thus having the ultimate economic welfare, growth and prosperity of Bangladesh.

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