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Impact of cash reserve ratio on banks profitability: A study on conventional commercial banks in Bangladesh

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ABSTRACT

This paper analyzes how banks profitability responds to fluctuations in cash reserve ratio in Bangladesh. Basically, it's purpose is to examine the effects of Bangladesh Bank practices of employing cash reserve ratio on banking intermediation activities and as a result its profitability, particularly in conventional commercial banking sector. Coefficient of Correlation is used to find out the relation between cash reserve ratio and banks profitability while t-test is utilized for testing hypothesis. Quantitative time series data for 5 years' time period of 2017-2021 was collected for the study. The researcher selects ten leading conventional commercial Bank as sample. This study highlights the consequences of movement in CRR on banks profitability by using secondary data. The finding of the study is that CRR has negative relation with banks profitability where Return on Assets (ROA) and Return on Equity (ROE) is studied as profitability indicator. It can be concluded that movement in CRR keep inverse impact on conventional commercial banks profitability in the long run by influencing the banks intermediary work. This paper helps the banks to stand strongly and strategically at the time of tight monetary policy when CRR rate increases by informing the inverse impact of this monetary tool.

Contribution/ Originality: As per the knowledge of the researchers, no empirical study has assessed the impact of CRR on conventional commercial banks in Bangladesh. Therefore, this study is a mere attempt by the researchers to fill this research gap in the banking industry of Bangladesh.

1. INTRODUCTION

A strong economy is totally rest on a strong financial system, where commercial Bank is the mainstay of the financial system because it acts as the main house of money circulation. It is noticeable that in the last four decades banking industry in Bangladesh has grown quickly and experiencing much more competition. In order to ensure profitability, stability, expansion and existence of a bank there is a high requirement of being profitable. For being profitable, commercial bank needs enough funds to make sure about satisfactory banking intermediation and activities. Where the funds availability which is considered as liquidity is controlled by monetary policy instruments of Bangladesh Bank (Hoque, Ahmad, Chowdhury, & Shahidullah, 2020) Everlasting macroeconomic stability and ensured effective compliance with governing and regulatory framework are the main factor for attaining sustainable financial performance of commercial bank.

Bangladesh Bank formulates monetary policy after every six months to regulate the activities of commercial banks which resulted control of money supply. Bangladesh Bank has been applying the Cash reserve ratio as a device of monetary policy to reinforce the money circulation. As per clause (1) article 36, Bangladesh Bank order 1972, every scheduled bank in Bangladesh must hold an amount not less than the required portion of its total demand deposits and time deposits with Bangladesh Bank vaults as cash balance as per the prescribed amount in the notification of Bangladesh Bank official gazette from time to time.

Fluctuations in cash reserve ratio results variation in availability of funds which ultimately affect the lending and deposit rate. Central bank increase CRR to handle inflationary pressure thereby it resulted a downward in commercial banks funds availability, and to handle deflationary pressure central bank decrease the CRR. When the cash reserve ratio increase (decrease) the loan giving capacity and investment capacity will decrease (increase). So, with the increased CRR financial intermediation becomes costlier, as a result of increasing lending and deposit rate and thereby influence the profitability (Glocker & Towbin, 2012).

Cash reserve ratio is imposed on every registered commercial bank and bank must comply with this requirement by keeping that required portion of deposit with central banks vaults. A fixed portion of total deposits of commercial bank that must have to keep as balance by means of cash with central bank is referred to cash reserve ratio. Central bank made changes in cash reserve ratio in order to control credit creation by affecting the fund availability and thereby handling the money circulation in the economy. As per the knowledge of the researchers, no empirical study has assessed the impact of CRR on conventional commercial banks in Bangladesh. Therefore, this study is a mere attempt by the researchers to fill this research gap in the banking industry of Bangladesh.

2. PROBLEM STATEMENT

There is a relation between fluctuations in CRR and variation in banks profitability of Bangladesh. CRR keep impact on the banks intermediation role by controlling its reserve and by that way affect its profitability. This paper is about to examine this relationship that changes in CRR has a significant influence on the ups and downs of banks profitability. The impact of the cash reserve ratio can be assessed by analyzing the sensitivity of profitability, i.e. ROA & ROE, with the changes in cash reserve ratio.

3. SCOPE AND LIMITATIONS

The scope of the study is the role of Bangladesh Banks regulatory compliance on banks profitability by requiring a specific amount of cash reserve. The study concentrated on the variability of banks profitability with the relation to changes in CRR. The period of 2017-2021 is covered by this study. 10 leading conventional commercial Bank is the selected sample area. The main limitation of the study is this financial year 2022 is not ended, so the audited financial statement for 2022 of the banks is not available. For this reason, the study doesn't cover the present year. As well as this study doesn't cover the whole banking sector of Bangladesh.

4. SUGGESTIONS FOR FURTHER STUDY

More banks in Bangladesh should take for a similar study. As well as, a study of this nature should involve more instruments of monetary policy in advocated.

5. LITERATURE REVIEW

According to Hoque et al. (2020) there is an inverse relation between cash reserve ratio and banks profitability in Bangladesh. This paper utilized secondary data for the period of 2011-2018 for investigating monetary policy impact on the commercial bank profitability in Bangladesh, mainly studied the impact of cash reserve ratio. This conclude that bank profitability rises with the decrease in cash reserve ratio and this paper recommended that commercial bank should make plan by focusing changes in cash reserve ratio.

According to Udeh and Nwannebbuike (2015) CRR has a positive relation with bank's profitability in Nigeria. The paper investigates the significant effect of monetary policy instruments on banks performance and considered only one bank - Zenith Bank in this study. The result is liquidity rate and Interest rate has a significant effect but cash reserve ratio and minimum rediscount rate has no significant impact because of its positive relation. This paper recommended that for better implementation Nigerian bank should take advantage of minimum rediscount rate's profit enhancement component and Central Bank of Nigeria should reform monetary policy so that it can be more attractive to the Nigerian banks.

Another study conducted by Abid and Lodhi (2015) to examine the impact of cash reserve ratio, a monetary policy tools, on the commercial banks profitability of Pakistan. This paper considers a sample frame of 17 commercial bank and utilized 10 years' time series data from 2005 to 2014. The paper resulted that Cash reserve ratio has a negative relationship with bank's performance (ROA and ROE). This paper concluded that CRR has a significant inverse effect on banks profitability that's why ROA and ROE will fall with the increased CRR.

Yesmine and Bhuiyah (2015) study the determinants of the financial performance of commercial banks in Bangladesh. The sample frame selected is a combination of 10 private commercial banks and 4 public commercial banks, and the study uses 7-year time series data from 2008 to 2014. The researchers interpret the variable return on assets as an indicator of financial performance, with bank size, credit risk, asset utilization, liquidity, operational efficiency, and capital adequacy as independent variables. This study reveals that credit risk has a negative impact on ROA, while asset utilization and operational efficiency have a significant impact on bank performance. The study recommends that commercial banks in Bangladesh consider asset utilization, operational efficiency, and credit risk when formulating their profitability strategies.

According to Uremadu (2012) Cash reserve ratio and statutory liquidity rate are positively related with bank's profitability in Nigeria. This study utilized secondary data from 1980 to 2006 and CRR and SLR as the independent variable. This paper obtained that the bank's profitability is negatively related with CRR and SLR. So, as per his study CRR has no significant effect on banks profitability.

According to Teja, Tejaswi, Madhavi, and Ujwala (2013) there is a significant impact of cash reserve ratio on the interest rates and liquidity of banks. The investigation also found that any revision in cash reserve ratio will have direct impact on stock market and overall economy.

Oganda, Mogwambo, and Otieno (2018) conduct a research to study how commercial bank performance is affected by Cash reserve. As per this study, cash reserve ratio has a negative relationship with bank's profitability in Kenya. Only two Kenyan commercial banks are taken as sample for the investigation of cash reserve requirement impact. There is a recommendation that in order to flourish the banking industry and to increase financial performance of commercial bank, the cash reserve ratio need to be minimized in Kenya.

Rao and Somaiya (2006) conducted a study to examine how monetary policy affects the profitability of Indian banks. For the study, the researchers considered bank rates, SLR, and CRR as monetary policy tools, while ROA and ROE were considered profitability indicators. The study concluded that lending rates are positively correlated with bank profits. While the regression coefficients of the cash reserve rate, discount rate, and statutory liquidity rate are not significant in explaining the relationship between bank profitability and the monetary policy instruments of Indian public sector banks, the researchers concluded that the banking sector should be regulated in accordance with India's strict credit policy to fight inflation.

Pan, Song, Wang, and Hu (2012) used monthly numerical data from January 2006 to March 2011 to examine the impact of revision of reserve requirement ratio on banks profitability in China. The study found a long term but negligible negative effect of revision of required reserve ratio on money circulation and credit scale. But fluctuations in RRR has not any direct control on liquidity management, inflationary pressure and credit activity.

6. RESEARCH METHODOLOGY

This paper involved time series data collected from audited financial statements and descriptive research design is utilized for the study. The Karl Person's coefficient of correlation is used to analyze the collected data. And t –test statistic used to test the research hypothesis.

Formulas are given below:

$$tc = \frac{r}{\sqrt{\dfrac{1 - r^2}{n - 2}}}$$

Where,

tc = calculated t

r = coefficient of correlation

n = number of observed years

Coefficient of Correlation:

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{n\Sigma X^2 - (\Sigma X)^2 \text{ x } n\Sigma y^2 - (\Sigma y)^2}}$$

Where,

n = number of observed years

∑ = summation

x = average ROA/ROE for selected bank

y = Cash Reserve Ratio

6.1. Sample Size

Banking industry in Bangladesh is the population of this research. There are 61 scheduled commercial banks in Bangladesh and 33 conventional commercial Banks are incorporate according to Bangladesh Bank report. 10 leading conventional commercial Banks are selected as sample.

6.2. Variable Specifications

The study takes Cash reserve ratio as independent variable and Banks profitability as dependent variable where ROA and ROE are the determinants of it.

6.3. Sources of Data

This paper considers secondary data. The audited annual report 2021 of the selected banks is utilized for collecting annual profit figures for five years, from 2017-2021. Bangladesh Bank report is used to collect the CRR rate.

6.4. Research Objectives

The general objectives of this study are to assess the impact of cash reserve ratio on banks profitability in Bangladesh (2017-2021). However, the specific objectives are:

1. To assess if Cash Reserve Ratio has negative relation with Return on Assets.
2. To assess if Cash Reserve Ratio has negative relation with Return on Equity.

6.5. Research Question

i. Does Cash Reserve Ratio have negative relations with Return on Asset (ROA)?
ii. Does Cash Reserve Ratio have negative relations with Return on Equity (ROE)?

6.6. Research Hypothesis

a. *H0a: CRR has a negative relation with Bank's Return on Assets.*
H1a: CRR has a positive relation with Bank's Return on Assets.
b. *H0b: CRR has a negative relation with Bank's Return on Equity.*
H1b: CRR has a positive relation with Bank's Return on Equity.

7. RESULT & DISCUSSION

The average profitability figures from 2017-2021 showed a continuous increase within the period details are shown in Appendix A, B & C. As well as the Cash Reserve Ratio for the period of 2017-2021 are shown in Appendix C.

Table 1. Result of data analysis and test of hypothesis.

Hypothesis	Factor	Coefficient of correlation (r)	T-calculative value	T-tabulated value (5% level of significance)
H1	ROA- return on assets	-0.609	-1.331	±3.182
H2	ROE- return on equity	-0.657	-1.510	±3.182

Note: Details of the result are shown in Appendix D&E.

Table 1 shows that the correlation coefficient of return on assets is -0.609. Which pointed that a notable negative relationship existed between Return on Assets and Cash Reserve Ratio. Test of hypothesis H0a resulted -1.331as t-calculated value at the same time the tabulated value is ± 3.182. The tested hypothesis H0a is accepted because the t- tabulated value ±3.182 is greater than t-calculated value of -1.331. And therefore, CRR has a negative relation with Banks' Return on Assets. Which reveals that decreased rate of Cash Reserve Ratio is one of the significant reasons behind the increased rate Banks Return on Assets. Table 1 shows that the correlation coefficient of return on assets is -0.657. Which pointed that a notable negative relationship existed between Return on Assets and Cash Reserve Ratio. Test of hypothesis H0b exposed -1.510as the t-calculated value, contrarily the tabulated value is ±3.182. The tested hypothesis H0b is accepted because the t- tabulated value ±3.182 is greater than t-calculated value of -1.5102. Therefore CRR has a negative relation with Banks' Return on Equity. The result admitted that increased rate of Cash Reserve Ratio is one of the significant reasons behind the declining rate Banks Return on Equity.

The result signalizes that Cash Reserve Ratio has a negative relationship with banks profitability. Any Changes made in Cash reserve ratio negatively affect the banks profitability. Banks profitability decreases as result of high CRR on the other hand Banks profitability increase as a result of low CRR. The Findings of this study is that CRR has a significant negative impact on Banks profitability.

8. CONCLUSION

This study focused on the conventional commercial bank of Bangladesh and the impact of changes in requirements of cash reserves on bank profitability is studied, with ROA-return on assets and ROE-return on equity as indicators of profitability. This article provides empirical evidence on how cash reserve ratios affect bank profitability, which also contributes to the literature on monetary aspects of bank profitability. Basically, fluctuations in CRR control the banks intermediation role by affecting the availability of fund. Increase in CRR makes financial intermediation costly on the other side decrease in CRR helps to flourish money circulation as a result of decreased financial intermediation cost. The result of this research shows that there is a negative relationship between cash reserve requirement and banks profitability. And therefore, it will be concluded that changes in cash reserve ratio keep inverse impact on commercial banks profitability. With the increase (decrease) in cash reserve ratio, banks profitability will decrease (increase) in the long run by influencing the banks intermediary work. Bank should perform their work by maintaining the proper relations between Liquidity and profitability and keep concentration on monetary policies and take necessary strategy on the basis of the central banks requirement to boost their profit.

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APPENDIX

Appendix A. ROA (%) of leading ten conventional commercial bank of Bangladesh from 2017-2021.

SL no.	Name of bank	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)
1	Prime bank limited	0.84	0.54	0.54	0.76	0.45
2	AB bank limited	0.16	0.10	0.05	0.76	0.45
3	United Commercial bank ltd.	0.60	0.61	0.05	0.01	0.01
4	Uttara bank limited	0.85	0.96	0.97	0.90	0.87
5	NCC bank limited	0.94	0.82	0.86	0.87	0.93
6	Southeast bank limited	0.37	0.47	0.62	0.69	0.37
7	Dhaka bank limited	0.65	0.70	1.20	0.54	0.69
8	Jamuna bank limited	0.98	1.10	1.11	1.10	0.90
9	Eastern bank limited	1.28	1.22	1.30	1.15	1.04
10	Dutch Bangla bank limited	1.10	1.30	1.20	1.30	0.90

Source: Audited Annual Report 2021 of these Bank.

Appendix B. ROE (%) of leading ten conventional commercial bank of Bangladesh from 2017-2021.

SL no.	Name of bank	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)
1	Prime bank limited	10.61	6.31	5.93	8.31	5.07
2	AB bank limited	2.63	1.65	0.74	0.80	0.13
3	United Commercial bank ltd.	8.76	8.42	8.84	8.40	9.31
4	Uttara bank limited	11.09	12.27	11.94	11.66	11.20
5	NCC bank limited	10.49	10.45	11.51	11.10	11.63
6	Southeast bank limited	5.98	7.14	8.56	9.17	4.46
7	Dhaka bank limited	10.53	11.28	9.28	8.18	9.21
8	Jamuna bank limited	10.88	12.93	14.80	13.83	12.92
9	Eastern bank limited	15.51	15.04	16.52	13.83	11.41
10	Dutch Bangla bank limited	16.10	19.90	17.20	19.70	13.20

Source: Audited Annual Report 2021 of these Bank.

Appendix C. Yearly average profitability ratio figure of ten banks and CRR rates from 2017-2021.

Year	ROE (%)	ROA (%)	CRR (%)
2021	10.258	0.777	4.0
2020	10.539	0.782	4.0
2019	10.532	0.786	5.5
2018	10.428	0.794	5.5
2017	8.854	0.706	6.5

Appendix D. Test for CRR on ROA leading ten traditional commercial banks of Bangladesh.

Year	X	Y	XY	X2	Y2
2021	4.00	0.777	3.108	16.00	0.604
2020	4.00	0.782	3.128	16.00	0.612
2019	5.50	0.786	4.323	30.25	0.618
2018	5.50	0.794	4.367	30.25	0.630
2017	6.50	0.706	4.589	30.25	0.498
Total	25.5	3.845	19.515	42.25	2.962

Note: Let X represents the independent variable CRR and Y represent the dependent variable ROA.

Co-efficient of Correlation,

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{n\Sigma X^2 - (\Sigma X)^2 \text{ x } n\Sigma y^2 - (\Sigma y)^2}}$$

$$= \frac{(5*19.515) - (25.5*3.845)}{\sqrt{[(5*134.75) - (25.5*25.5)]*[(5*2.961921) - (3.845^2)]}}$$

= - 0.6094

Appendix E. Test for CRR on ROE of leading ten traditional commercial bank of Bangladesh from 2017-2021. let x represents the independent variable.

Year	X	Y	XY	X2	Y2
2021	4.00	10.258	41.032	16.00	105.227
2020	4.00	10.539	42.156	16.00	111.071
2019	5.50	10.532	57.926	30.25	110.923
2018	5.50	10.498	57.739	30.25	110.208
2017	6.50	8.854	57.551	42.25	78.393
Summation	25.5	50.681	256.404	134.75	515.821

Coefficient of Correlation:

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{n\Sigma X^2 - (\Sigma X)^2 \text{ x } n\Sigma y^2 - (\Sigma y)^2}}$$

$$= \frac{(5*256.404) - (25.5*50.681)}{\sqrt{[(5*134.75) - (25.5*25.5)]*[(5*515.821429) - (50.681^2)]}}$$

= - 0.6572

Test of Hypothesis:

H0a: There is a negative relationship between cash reserve ratio and banks' return on asset (ROA).

$$tc = \frac{r}{\sqrt{\frac{1 - r^2}{n - 2}}}$$

$$= \frac{-0.6094}{}$$

$$\sqrt{\frac{1-(-0.6572^2)}{5-2}}$$

$= -1.3313$

H0b: There is a negative relationship between cash reserve ratio and banks' return on equity (ROE).

$$tc = \frac{r}{\sqrt{\frac{1-r^2}{n-2}}}$$

$$= \frac{-0.6572}{\sqrt{\frac{1-(0.6572^2)}{5-2}}}$$

$= -0.15102$