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ORIGINAL ARTICLE

Effect of credit risk on commercial banks' profitability: A case study of Bangladesh

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Abstract

Purpose of the Study: Credit risk is the risk of default by the borrower. The major cause of a bank's failure is the lack of proper credit risk management (CRM). The study examined the impact of the credit risk on the profitability of the public and private sector banks in Bangladesh. **Materials and Methods:** A total of 20 public and private commercial banks (CB) were selected for a period of 5 years (2014–2018). The sample banks are AB Bank, Agrani Bank, Brac Bank, Bank Asia, The Citi Bank, Dhaka Bank, Dutch Bangla Bank, Exim Bank, First Security Islamic Bank, IFIC Bank, Islami Bank Bangladesh, Janata Bank, Mercantile Bank, Mutual Trust Bank, National Bank', NCC Bank, Prime Bank, Rupali Bank, Sonali Bank, and South East Bank Limited. The study was carried out using secondary data sourced from the annual reports. **Findings:** The study found that return on assets (ROA) showed statistically significant positive relationship with capital adequacy ratio (CAR) as well as cost to loan assets ratio. On the other side, ROA and non-performing loans (NPL) as well as bank size revealed a significant negative relationship. However, cash reserve ratio proved statistically insignificant relationship with ROA. Hence, the study concluded that among five credit risk indicators CAR, NPL, and bank size were the most important predictor of the CB' profitability. **Implications:** The implication of the study is that the respective authorities of the CB of Bangladesh could use the findings to take necessary actions regarding the CRM.

Key words: Commercial banks, credit risk, impact, profitability

INTRODUCTION

As a financial intermediary, the commercial banks (CBs) perform alike an overpass, through which depositors deposit is moved to deficit unit of the economy. Moreover, it plays a fundamental role in any economy by transferring financial resources from surplus unit to deficit unit. Hence, the CB services are considered as the heart of the economy and an effective credit risk management (CRM) and its practice is an ingredient part of safety, soundness, and profitability of the CB. Is an ingredient part of safety, soundness, and profitability of the CB (Asfaw and Veni, 2015).

The term credit risk is simply defined as the possibility that a bank borrower or counter-party will not be able to meet its obligations in accordance with the agreed terms (Basel, 1999). In case of credit risk, banks look at the five C's of the borrower to assess the credit risk. The term five C's include

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credit history, capacity to repay, capital of the borrower, the loan condition, and associated collateral.

History demonstrates that the most important reason of bank's collapse is the absence of appropriate CRM. The credit risk arises from bank's dealing with individuals, corporate, other banks, and financial institutions or a sovereign (Malla, 2017). It does not necessarily take place in separation. The same source that is responsible for credit risk of the bank may also expose it to other risks such as, operational risk, interest rate risk, and liquidity risk. On the other hand, an awful portfolio may magnetize liquidity problem. The soundness and safety of the bank are determined by efficient CRM adopted by the bank. Worldwide, more than 50% of total risk in the bank and financial institutions are originated from poor credit management (Malla, 2017).

As the CBs fund is highly leveraged or public fund, CBs should have crash and efficient RM system. On the other side, proper RM method and exercise in the bank are a subject of endurance for not only safekeeping of an individual bank and depositors but also for countrywide and worldwide economic solidity. Moreover, practicing efficient CRM method plays a great role in protecting customers and shareholders against risk of losing their deposits and capital, not only through maintaining soundness, liquidity, profitability, and stability of the banking industry but also through enhancing competitive advantage, improving mobilization and deployment of fund as well as optimizing risk-return and reducing cost. However, weak CRM direct to the buildup of non-performing loans (NPL) under which the generated profits are, not only eroded through loan provision but also reliability, security, and performance of the bank are decreased (Asfaw and Veni, 2015).

The ultimate objective of the research was to examine the effect of credit risk on the profitability of CB in Bangladesh.

Justification of Study

Globally, a number of researchers together with (Kharabsheh 2019; Iftikhar 2016; Isanzu 2017; Gizaw et al. 2015; Nawaz et al. 2012; Hallunovi and Berdo 2018; Kolapo et al. 2012; Poudel 2012; Singh and Sharma 2018; Alshatti 2015; Nwude and Okeke 2018; Kutum 2017 and Bhattarai 2019), etc., conducted research to explore the impact of credit risk on CB' profitability. A few studies have also been done in Bangladesh with the same focal point such as (Lalon 2015; Noman et al. 2015; Jahan and Rahman 2017; Islam et al. 2019; Banik, 2018; Das and Das 2007; Hasan et al. 2014 and Lalon and Morshada 2020). However, among Bangladeshi researchers, Noman et al. (2015) found a robust negative and significant impact of NPL and CAR on CB' profitability; Jahan and Rahman (2017) showed that relationship between NPL and profitability is strongly significant for private CB but insignificant for state-owned banks; Islam et al. (2019) discovered a positive relationship between CAR and ROA but negative relationship between NPL and ROA; Banik (2018) revealed that the impact of percentage of classified loans (POCL) is not significant on ROA and return on equity (ROE) (profitability indicators) in the short run; Das and Das (2007) recommended that the existing methods of CRM are not sufficient enough to fight with the present demanding financial and economic environment in Bangladesh; and Hasan et al. (2014) showed significant negative effect of CAR on ROE, whereas NPL had significant positive effect on ROE (profitability indicator); and Lalon and Morshada (2020) found that the excess NPL does not all the times decrease the net income (NI) of CB rather it hastens the future performance of the CB. It is, therefore, evidenced that there is a huge scope of further study. Hence, this research was undertaken to present some empirical evidence on the effect of credit risk on CB' profitability in Bangladesh.

LITERATURE REVIEW

We have done following literature review works to fulfill the eventual objective of the research:

Lalon (2015) and Noman et al. (2015) carried out a research on CRM practices in CB of Bangladesh. Although, Lalon (2015) showed an optimistic association between CRM and CB profitability but Noman et al. (2015) showed a sturdy pessimistic effect of NPL and LLR (loan loss reserve ratio) on all the indicators of profitability. However, Jahan and Rahman (2017) conducted a research on efficiency of CRM and its collision on the profitability of PCBs and SOCBs in Bangladesh. In case of PCBs, the study revealed a robust association between NPL and financial performance, whereas it was statistically insignificant for state-owned CB. On the other side, (Islam et al. 2019) discovered that CAR and NPL have a positive and negative relationship with ROA, respectively. Banik (2018) also showed that the impact of is not significant on ROA and ROE. However, Hasan et al. (2014) showed a negative and significant association between capital adequacy ratio (CAR) and ROE and positive and robust association between NPL and ROE. Das and Das (2007) concluded in his research study that the existing methods of CRM are not sufficient enough to fight with the present demanding financial and economic environment in Bangladesh. In addition, Lalon and Morshada (2020) recommended that the excess NPL does

not decrease the NI of CB all the times rather it hastens the future performance of the CB in Bangladesh.

Kharabsheh (2019) investigated the main indicators credit risk in Jordanian banks. Study results showed that more profitable and larger banks had lower credit risk in Jordan. However, operating inefficiency, credit growth rate, and capital ratio were responsible for significant increase of credit risk in Jordanian CB. Moreover, (Iftikhar, 2016) examined the association between CRM and CB profitability in Pakistan and concluded that different CRM factors have considerable force on the CB profitability. However, Isanzu (2017) provided evidence from Chinese banking industry that NPL and CAR have an important effect on profitability of China CB. On the other hand, (Gizaw et al. 2015; Nawaz et al. 2012 and Hallunovi and Berdo, 2018) tested the shock of credit risk on the financial performance of banks and they expressed a strong significant shock of credit risk on the financial performance of CB in Ethiopia, Nigeria, and Albania, respectively. However, (Kolapo et al. 2012) empirically showed that a 100% increase in NPL reduces profitability by about 6.2% in Nigeria. On the other side, Nwude and Okeke (2018) illustrated that CRM has a positive and non-significant impact on total loan and advances, the ROA, and ROE.

Moreover, (Poudel, 2012; Bhattarai 2016 and Bhattarai, 2019) proved strong positive association between CRM and CB financial performance in Nepal. On the other hand, Singh and Sharma (2018) conducted a research in India and also recommended positive association between return on assets (ROA) and CAR. However, Kutum (2017) showed that relationship between CRM and financial performance is insignificant in India CB.

MATERIALS AND METHODS

This study basically used a descriptive research design and done using secondary data. Hence, we selected a total of 20 public and private CB operating in Bangladesh as sample. The sample banks are AB Bank, Agrani Bank, Brac Bank, Bank Asia, The Citi Bank, Dhaka Bank, Dutch Bangla Bank, Exim Bank, First Security Islamic Bank, IFIC Bank, Islami Bank Bangladesh, Janata Bank, Mercantile Bank, Mutual Trust Bank, National Bank', NCC Bank, Prime Bank, Rupali Bank, Sonali Bank, and South East Bank Limited. Accordingly, we collected secondary data mainly from these sample banks' website through analyzing annual reports for the period of 2014–2018. Moreover, in this study, we used multiple regression model, descriptive statistics, multicollinearity test, one-way ANOVA, and MS Excel. Multiple regression models are showed below:

$$ROA = \beta_0 + \beta_1 * CAR + \beta_2 * NPL + \beta_3 * CLA + \beta_4 * CRR + \beta_5 * BS$$

Where, ROA represents banks profitability; CAR: Capital adequacy ratio; NPL: Non-performing loans ratio; CLA: Cost to loan assets ratio; CRR: Cash reserve ratio; BS: Bank size; β_1, β_2, β_3, β_4 and β_5: Coefficients; β_0: Constant.

Study Variables

This study used both dependable variable (ROA) and independent variables (CAR, NPL, CLA, CRR, and Bank size) which are described in Table 1:

Research Hypothesis

Based on research objective and literature review, following research hypothesis was developed:

H_1 = CAR has significant positive effect on the CB' profitability.

H_2 = NPL has significant negative effect on the CBs' profitability.

H_3 = CLA has significant negative effect on the CBs' profitability.

H_4 = CRR has significant positive effect on the CBs' profitability.

Table 1: Description of study variables

S. No.	Types	Variables	Description
1	Independent variable (credit risk)	Capital adequacy ratio	Capital (both Tier 1 and Tier 2)/Risk weighted assets
		Non-performing loans ratio	Non-performing loans/loans and advances
		Cost to loan assets ratio	Operating cost to loan assets
		Cash reserve ratio	5.50% of total time and demand liabilities (2 months earlier)
		Bank size	Natural logarithm of total assets (LnTA)
2	Dependable variable (profitability)	Return on assets	Net income/Total assets

H_5= BS has significant negative effect on the CBs' profitability.

RESULTS AND DISCUSSION

Some important descriptive statistics are illustrated in Table 2. The financial performance measured by ROA had average value of 0.81%. On the other side, highest and lowest value and standard deviation of ROA showed (1.12), 2.02, and 0.52%, respectively, which indicated that financial performance among CBs in Bangladesh vary greatly.

The minimum CAR was 6.53% which indicated that CB in Bangladesh was unable to maintain regulatory requirement of 10%. On the other hand, the minimum and maximum values of NPL were 2.08% and 35.28%, respectively, which indicated a high volatility among the CB' ability in Bangladesh. Similarly, cost per loan asset (CLA) also shows a high volatility as CLA varied from 1.76% to 7.02%. However, average cash reserve ratio (CRR) is 7.15% which is slightly higher than regulatory requirement of 6.50%. On the other hand, bank size has minimum value of 11.66 and maximum value 14.08 with a very low standard deviation of 0.53.

Test for Multicollinearity

The study made use of variance inflation factor (VIF) and the tolerance test [Table 3] to examine the multicollinearity of data. The results indicate that multicollinearity does not exist in the data as none of the VIF values for all independent variables is higher than 0.40.

Regression Analysis

Regression analysis results showed in Table 4. It was found that value of correlation coefficient R=0.6821 which meant that there was a strong linear association between ROA and credit risk. On the other side, the value of R Square was 0.4652, that is, 46.52% variations of CB profitability occurred due to credit risk indicators.

Table 5 showed beta coefficient (β) of five independent variables with P-value. It was found from the table that beta coefficient for CAR, CLA, and CRR was positive to ROA. It stated that when CAR, CLA, and CRR of CB were raised in one unit, ROA of CB was increased by 0.088 unit, 0.071 unit, and 0.011 unit, respectively, keeping other repressors constant. Similarly, the beta coefficient of NPL (non-performing loan ratio [NPLR]) and BS was negative to ROA, which implies that larger the beat coefficient of NPLR and BS lower would be ROA. Since the p-value of CAR, NPLR and CLA were <0.05; these results were statistically significant at 5% level. On the other side, the *P*-value of BS was 0.089 which indicated significant at 10% level. However, as the *P*-value of CRR much more than 0.05, this result was statistically insignificant.

Table 6 showed that the calculated value of F is 16.353. As the calculated value of F was greater than tabulated value of 2.29 [$F_{k, (n-k-1),\alpha}$=2.29] at 5% level of significance, it is said that the regression model was appropriate.

Test of Hypothesis

H_1=CAR has significant positive effect on the CB' profitability.

As the relationship between ROA and CAR was positive and *P*-value was below 0.05 at 95% confidence interval, it was enough to accept the hypothesis.

H_2=NPL has significant negative effect on the CB' profitability.

As the relationship between ROA and NPL was negative and *P*-value was below 0.05 at 95% confidence interval, it was enough to accept the hypothesis.

Table 2: Descriptive statistics of variables

Variables	Mean	Minimum	Maximum	Std. Error	Standard deviation
Return on assets (%)	0.81	−1.12	2.02	0.05	0.52
Capital adequacy ratio (%)	11.95	6.53	17.04	0.17	1.72
Non-performing loan ratio (%)	8.73	2.08	35.28	0.75	7.49
Cost to loan assets (%)	3.38	1.76	7.02	0.13	1.30
Cash reserve ratio (%)	7.15	5.55	14.33	0.16	1.61
Bank size (LnTA)	12.69	11.66	14.08	0.05	0.53

Source: Sample banks annual reports and results are computed by Microsoft Excel.

H_3=CLA has significant negative effect on the CB' profitability.

Although *P*-value was below 0.05 at 95% confidence interval, but the relationship between ROA and CLA was positive hence, it was enough to reject the hypothesis.

H_4=CRR has significant positive effect on the CB' profitability.

As the relationship between ROA and CRR was positive and P-value was more than 0.05 at 95% confidence interval, it was enough to reject the hypothesis.

H_5=BS has significant negative effect on the CB' profitability.

Table 3: Test of Multicollinearity

Variables	Tolerance	Variance inflation factor
Capital adequacy ratio (%)	4.28	0.23
Non-performing loan ratio (%)	2.78	0.36
Cost to loan assets (ratio)	5.99	0.17
Cash reserve ratio (%)	6.21	0.16
Bank size (LnTA)	3.74	0.27

Table 4: Regression analysis

Regression statistics	
Multiple R	0.6821
R Square	0.4652
Adj. R Square	0.4368
Std. Error	0.3884
Observations	100

As the relationship between ROA and BS was negative and P-value was below 0.10 at 90% confidence interval, it was enough to accept the hypothesis.

DISCUSSION

In general, investors, regulators, shareholders, and general depositors want to know about the profitability condition of a bank or financial institution. In this regard, ROA is an indicator of how profitable a bank or financial institution is relative to its assets. The study results showed that ROA of CB in Bangladesh was increasing very slowly throughout the study period except one state owned bank (which was negative in the year 2016). If ROA rises over time, the bank or financial institution is doing job of increasing its profit. However, a falling ROA indicates the bank or financial institution might have over invested in assets that have failed to produce revenue. On the other side, CAR is the amount of capital a bank retains to its risk. CAR helps to make sure that banks have enough capital to protect depositors' money. Regulators must track the CAR of banks to determine how effective it can sustain a reasonable amount of loss. The CAR ensures the efficiency and stability of a nation's financial system by lowering the risk of banks becoming insolvent. The study found that CB were maintaining sufficient CAR (mean CAR 11.95%) throughout the period except one state owned bank (which was 6.53 in 2018). In general, bank with a high CAR is considered safe and likely to meet its financial obligation. However, the size of NPLs in Bangladesh is very high. The high NPLs ratio diminishes the overall credit quality of banking sector in Bangladesh. The study results revealed that the highest NPLs ratio of CB in Bangladesh was 35.28%. This high NPLs ratio limits the new lending capacity of CB. Moreover, rising levels of NPLs require banks to raise provisions against loan losses and banks with high NPLs cannot take risk due to lower profits. In addition to that, funding costs also rise. On the other side, CLA is the average operating cost per loan and advanced to customers. CLA expressed management efficiency in distributing loans

Table 5: Coefficients of independent variables

Description	Coefficients	Std. Error	t Stat	*P*-value
Intercept	1.742	1.222	1.426	0.157
Capital adequacy ratio (%)	0.088	0.028	3.121	0.002*
Non-performing loan ratio (%)	–0.021	0.008	–2.594	0.011*
Cost to loan assets (ratio)	0.071	0.032	2.256	0.026*
Cash reserve ratio (%)	0.011	0.025	0.434	0.665
Bank size (LnTA)	–0.168	0.098	–1.718	0.089**

*Significant at 5% level and **Significant at 10% level

Table 6: ANOVA

Description	df	SS	MS	F	Sign F
Regression	5	12.335	2.467	16.353	0.000
Residual	94	14.181	0.151		
Total	99	26.516			

to customers. Normally, CLA showed negative relation with profitability in banks. This may not be true in cases where there are high expenditures due to a lot of business done; the bank can still increase the returns (Bhattarai, 2019). Study outcomes illustrated positive association CLA with bank profitability. On the other hand, the bank size is an important factor of profitability. It can affect the internal operation of banks in either way. The outcomes of the study showed that bank size has negative effect of CB' profitability. From regression result, if bank size increased 1%, profitability of banks would decrease 0.16%. Moreover, a negative relation also indicated diseconomies of scale.

CONCLUSION

The objective of the study was to evaluate the effect of credit risk on the CB' profitability. The study results showed a significant positive relationship between ROA and CAR as well as CLA. On the other hand, ROA and NPL as well as bank size had significant negative relationship. That means, if CAR and CLA increase than profitability of CB would rise. However, if NPL ratio and bank size go up than profitability of CB would decrease. It is, therefore, concluded that among five credit risk indicators, CAR, NPL, and BS were the most important predictor of the bank profitability, whereas CRR was not significant predictor of bank profitability. The practical implication of the study is that the respective authorities of the CB of Bangladesh could use the findings to take necessary actions regarding the CRM. Moreover, it could add value in the existing literature of this field. On the other hand, students get much need empirical data on the effect of credit risk on CB' profitability.

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Future Scope

As the study was carried out based on secondary data, hence, there is a further scope of research.

CONFLICT OF INTEREST

There is no any conflict of interest as we conducted our research for our own interest.

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