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Impact of Credit Risk Management on the Profitability of Commercial Bank in Bangladesh: A Study on Prime Bank Limited

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Abstract
The main objective of this paper is to find the impact of credit risk management on the private bank's profitability. To analyze the trends of credit risk management and to show the impacts through regression analysis I have gathered data of 10 years (2011-2020) of nine different ratios. I have divided the ratios into two sections of which one is credit risk management-related ratios and another is profitability ratios. Credit risk management ratios will indicate how the bank is managing its credit in relation to total deposits, total assets and the debt and non-performing loan rate will show the performance of the bank to manage the credit. The trend analysis is done for constructing a brief idea about the present scenario of the company whether the bank is in an increased or decreased trend in terms of the ratios. The regression analysis will show the impacts of credit risk management on profitability. For regression analysis, we assume net interest margin as dependent variable and loan to total deposit, credit to total asset, non-performing loan to total asset, debt ratios are assumed as independent variables. Because of some lacking in the assessment of credit proposal, improper valuation of collateral, improper documentation and unsatisfactory loan recovery process, bank's return on assets is decreasing day by day and the non-performing loan rate is increasing year by year. However, after regression analysis, it is found that there is a positive relationship between net interest margin and the other four independent variables. A statistically significant relationship is found among net interest margin and the independent variables' with $\alpha = 0.05$. Net interest margin is more sensitive to the credit to the total asset as, if credit to total assets increased by 1unit NIM will be increased by 8.58% which is very significant.
Keywords: Credit Risk Management, Profitability, commercial Bank, Bangladesh.

1.1 Introduction
Prime Bank Limited is a renowned bank of Bangladesh that is performing great roles to support the economy to grow and to remain the financial sector stable. It has introduced many policies regarding its credit risk management strategies so that it can contribute to the profitability of its own portfolio as well as to the economy. We all know every business has risk but in the banking sector, the most significant risk is the credit risk which all bank faces. It means the borrower or other related parties cannot meet the terms and conditions written on the contract. Losses of the bank stream from the violation of any obligations while trading, disbursement, or other legal transactions. Prime Bank Limited has a positive impact on profitability because of its robust capability to assess the borrower, strong credit sanctioning, and a resilient recovery process.

Now, education is foremost to cope up in this globalization era to develop one's capability to outlook the real world. Only books and academic knowledge cannot make a flawless competitive student. For the advancement of a society or to make a student perfect practical knowledge is very important. Through the study, I have got the chance to explore the real business world, working environment and norms, and many more professional things. I got the opportunity to work at Prime Bank Limited at Tongi Branch as an intern. I have worked on General Banking Divisions and Credit Risk Management division as well as other divisions of Prime Bank Limited and throughout this study, I will try to show the impacts of CRM on profitability.

1.2 Objectives of the study

a. To find the credit-related factors which affect much on increasing or decreasing profitability.
b. To evaluate the duties of the credit risk management division.
c. To review the enactment of the bank's credit accomplishments.
d. To identify the risk minimization factors related to credit and highlight those techniques.
e. To find out the loops and problems faced by banks and customers in relation to CRM.

2.0 Literature review

Credit Risk Management of a bank helps to maximize its risk-adjusted revenues through maintaining an acceptable limit of credit risk exposure and to understand the impact of profitability on a bank's profitability (Kargi, 2011). Risks are considered as credit risks when the debtor or counterparty fails to meet all the terms and conditions which are in the agreed contract. It is observed that if the market value of the asset declines and there is seen any delay in repaying the loan it will be the credit risks (BCBS, 1999). No customer is small for the bank if one borrower gets defaulted, the bank may face a large loss so there will be a critical credit risk situation where a bank can face liquidity problems or have insolvency (Bessis, 2002).

Research by Lalon (2015) concluded the CRM process, advantages, challenges, and other related issues. He states that credit risk management has positive impacts on profitability. The important point out from the report was for good credit risk management practices in Bangladesh the bank has to bear an additional cost of training and cost for employee motivation. (Poudel, 2012) has published a research paper on international journals based in Nepal which stated that credit risk management and a bank's financial performance are co-related. He added that every bank may design and formulate new strategies so that the credit exposure is not minimized and the profitability of the bank increases.

As per (Demirguc-Kunt and Huzinga 1999) credit, risk management is a mixture of two-fold activities one is after losses have happened the losses become unbearable and another one is the working procedure of developments of commercial paper, documentation, securitization, and other competitors pushed banks to find viable loan borrowers. The report of (Ben-Naceur and

Omran 2008) explains that there is a positive impact of credit risk management on a bank's net interest margin cost efficiency and bank's profitability. But the fact is found through examining the influence of the regulations and infrastructural developments of banks and financial institutions. Takeda and Shawn (1998) state that if the volume of loan provision increases the non-performing loan will also increase thus the credit risk will increase and banks have to face adverse financial performance and may have a negative or low rate of profitability.

In the report of Boahene (2012) I also found an affirmative relationship among commercial banks' credit risks and their performances. In his report, he considered six Ghanian commercial banks and cover 5years' data. He found that the non-performing loan rate, net credit to the total assets is positively related and measured by return on equity. He also added the bank can enjoy high profitability when the credit risk variables are high because if the lending interest rate, commission, or fees are high the bank will enjoy high profitability.

There is a report by (Muninarayanappa and Nirmala, 2004) in which, the discussion was about how the internal and external factors of credit risk management affect the profitability of a bank. They highlighted those success factors of credit risk management lies in proper credit risk strategies, a good environment of credit risk management, and implement policies by the banks.

As per (Rose, Peter.S, 2001) the credit risk lies in banking activities, in their trade book, or in their off-balance sheet. High credit risk lies in various instruments of a bank such as interbank transactions, foreign exchange, swaps, bonds, settlements, and guarantees, etc. Heffernan and Fu (2008) examine the performance of different types of Chinese banks during the period1999 and 2006. The results suggest economic value added and the net interest margin do better than the more conventional measures of profitability, namely return on average asset (ROAA) and return on average equity (ROAE). Some macroeconomic variables and financial ratios are significant with the expected signs.

Heydari & Abdoli (2015) wrote this empirical report in Iran and it was published in the Indian Journal of Science and Technology. In this report, the researchers focused that the impact of credit risk management and capital adequacy on the financial performance of business banks. This is an inductive type of report and also called applied research. The prime objective of the researcher is to determine the relationship between the variables.
Guru et al. (2002) investigate the determinants of bank profitability in Malaysia. They used a sample of 17 commercial banks during the 1986 to 1995 period. The profitability determinants were divided into two main categories, namely the internal determinants (liquidity, capital adequacy, and expenses management) and the external determinants (ownership, firm size, and economic conditions). The findings revealed that efficient expenses management was one of the most significant in explaining high bank profitability. Dermiguc, Kunt, and Huizinga (2001) present evidence of the impact of financial development and structure on bank profitability using bank-level data for a large number of developed and developing countries over the 1990–1997 period. The paper finds that financial development has a very important impact on bank performance. They find that higher bank development is related to lower bank performance, due to tougher competition.

Although banks, at present, are being troubled for a vast number of reasons, credit risk is one of the major ones. Banks with poor portfolio risk management are more affected by the curse of credit risk. It is the risk that one or more of the borrowers is unable to or unwilling to repay their loans. CAMEL elements have a significant on the performance of commercial banks (Fredrick, 2012). The purpose of this report was to show the impact of credit risk management on the financial performance of commercial banks. Capital adequacy, asset quality, management efficiency, earning, and liquidity are used as independent variables. A report conducted on Turkish banks revealed that the industrial production index (IPI), the Inefficiency ratio of all banks (INEF), Istanbul Stock Exchange 100 Index (ISE) have a negative impact on the non-performing loans (NPL) ratio. In contrast, return on equity (ROE), Unemployment rates (UR), capital adequacy ratio (CAR) has a positive impact on the NPL ratio (Vatansever and Hepşen, 2013).

Vatansever & Hepşen (2013) did this empirical report in Turkey and it was published in the Journal of Finance and Investment Analysis. In this report, researchers examined the relationship between the NPLs ratio and several macroeconomic and bank-specific factors in Turkey by using the ordinary least square estimation approach with integration analysis and the time series from January 2007 to April 2013. They founded from an empirical report that debt ratio, loan to asset ratio, confidence index-real sector, consumer price index, EURO/ Turkish lira rate, USD/ Turkish lira rate, money supply change, interest rate, GDP growth, the Euro Zone's GDP growth and volatility of the Standard & Poor's 500 stock market index does not have a significant effect to make clear NPL ratio on multivariate perspective.

In the report of Haneef et al (2012), they argued that there were no proper risk management techniques for managing risk in the banking industry in Pakistan. They concluded that non-performing loans were increasing due to a lack of risk management which threatens the profitability of banks. They suggested that the banking sector can avoid their nonperforming loans by adopting methods suggested by state bank of Pakistan. One of the major drawbacks of the report was that it failed to justify its conclusion empirically.

There are very little research has been conducted on the impact of credit risk management on the profitability of a particular bank in Bangladesh. There have been many research papers on the impact of credit risk management on the profitability of commercial banks in Bangladesh and in other countries. These studies cover analysis of CRM impacts on the profitability of Prime Bank Limited only. The other research papers have not included the most recent data which is included in my study.

3.0 Methodology of the study

To implement the objective of my study, data of 10 years have been collected of Prime Bank Limited consists of nine ratios which are related to credit risk management and profitability of the bank. To highlight the impacts of credit risk management on profitability, the data have been processed in two analytical parts. One is trend analysis which will show the increasing or decreasing trend of the ratio and how the impacts of credit risk management are causing profitability by that ratio. Another one, regression analysis will show the magnitude of the impacts of CRM on profitability. In regression analysis, there is one dependent variable (Net interest margin) and four independent variables (Loan to Deposit Ratio, non-performing loan to total loan, credit to total asset, and debt ratio to find out the best results for the study.

4.0 Data analysis

4.1 Loan to deposit ratio: This ratio indicates that how well the bank is managing and investing its deposits to earn profit. Prime Bank Ltd. believes that sanctioning more credit beyond capacity will be risky to survive or to earn profit. As per the Bangladesh Bank, no bank can invest in their total fund. Deposits for the bank are liabilities that customers can demand at any time. So their loan rate has seen very steady wandering 80 to 88% all of the year. But from 2011 to 2020 their loan to deposit ratio was around 69.86% to 74.95% because at those years their NPL rate became higher than the previous year.

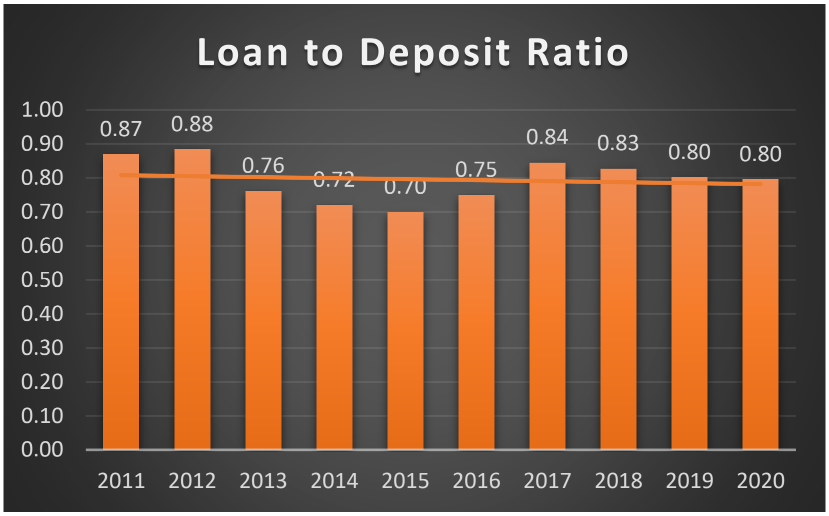

Figure: 4.1

4.2 NPL to Total Loan: To measure the NPL rate in comparison to total loan is important because it represents the capacity of a bank to recover the principal amount of loan and interest earnings which affects the profitability of a bank. In 2011, the NPL to total loan ratio was at a satisfactory stage of 1.37%. Since 2012, this rate started rising gradually till 2020. Since then, it started showing a downward trend.

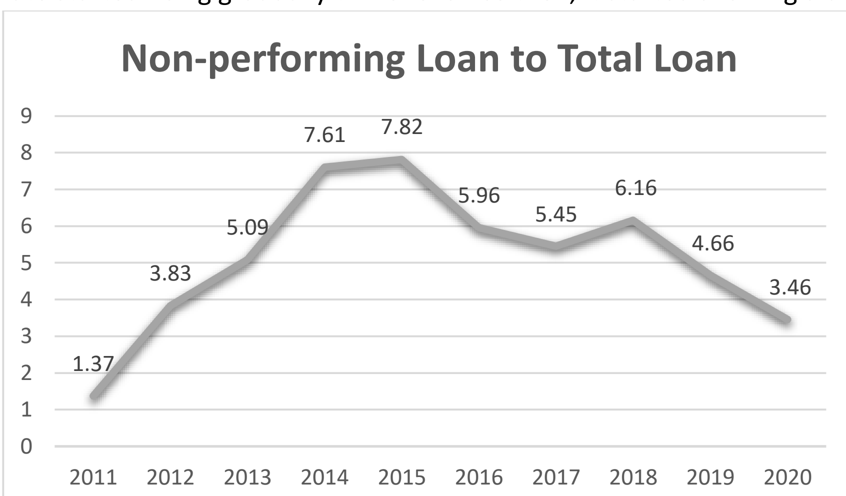

Figure: 4.2

4.3 Credit to Total Asset: This ratio indicated that how much credit has been sanctioned in relation to Prime Bank Limited's total assets. If this ratio is higher that means banks have less liquidity which can be risky for a bank. As no bank can do aggressive lending, banks follow a trend in sanctioning credit. Prime Bank Limited has a good reputation in sanctioning credit that’s why their credit to total asset is 60% to 70% all the year. But in 2014 their credit sanction was around 57% because of their strategy to decrease the loan default rate.

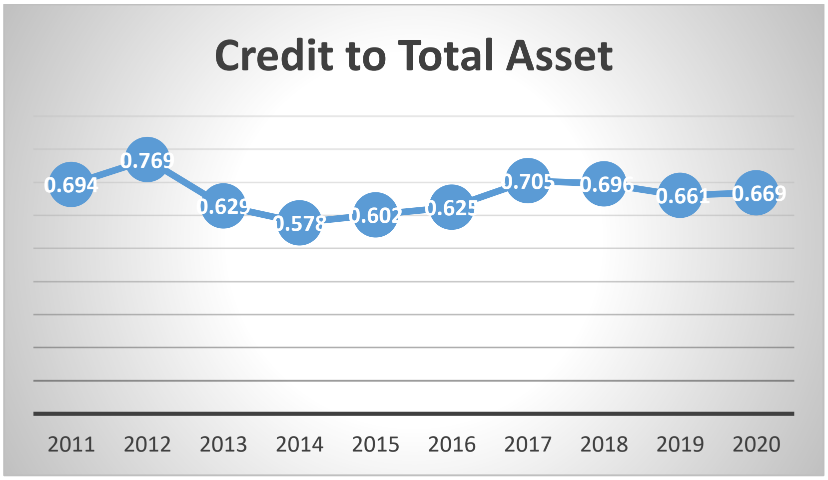

Figure: 4.3

4.4 Return on asset: The ratio is the indicator of how the company is managing all the economic resources to generate profits. Credit is the prime asset so that's how it is related to profitability. The higher the ratio, the higher will be the productivity of the company. In 2011, the return on assets was at its peak. But from 2012 to 2020, it is continuously decreasing with some minor increase in 2014 and 2018 because of the lack of the PBL ineffective management of resources.

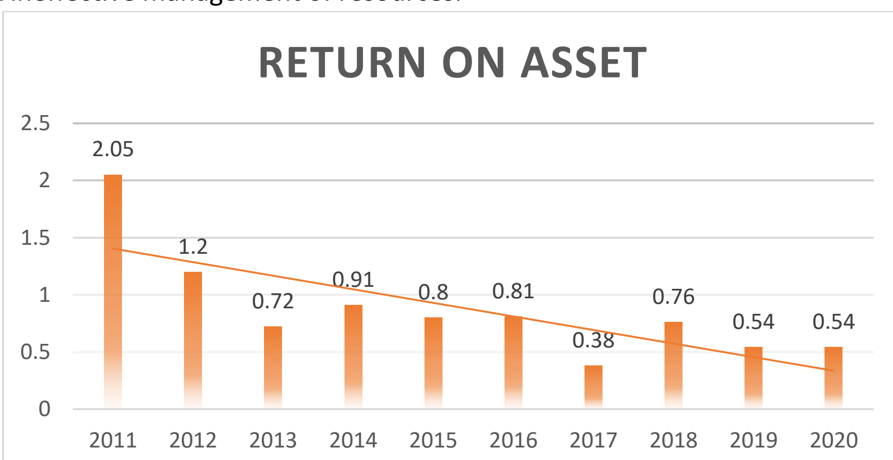

Figure: 4.4

4.5 Price-earnings ratio: It represents the value of the company. It also explains the prospects of the market and the per-unit price which amount companies must have to pay from their current earnings to the shareholders. Prime Bank's price-earnings ratio is 10.77 as of 2020. This ratio was at its peak in 2017 with a ratio of 26.62. Lower PE ratio in recent times indicates that the stock of PBL is undervalued or the investors are expecting a low growth rate in the future.

Figure: 4.5

4.6 Return on Equity: It measures the efficiency of a company to generate profit without requiring much capital. If the shareholders' equity value goes up the return on equity will go down as there exists an inverse relationship. It also explains how the company is deploying its capital. The ROE shows an overall decreasing trend during the 10-year period between 2011 and 2020. Although ROE marked its highest in 2012 at 13.53%, the decreasing trend indicates the weakness in the management strategies.

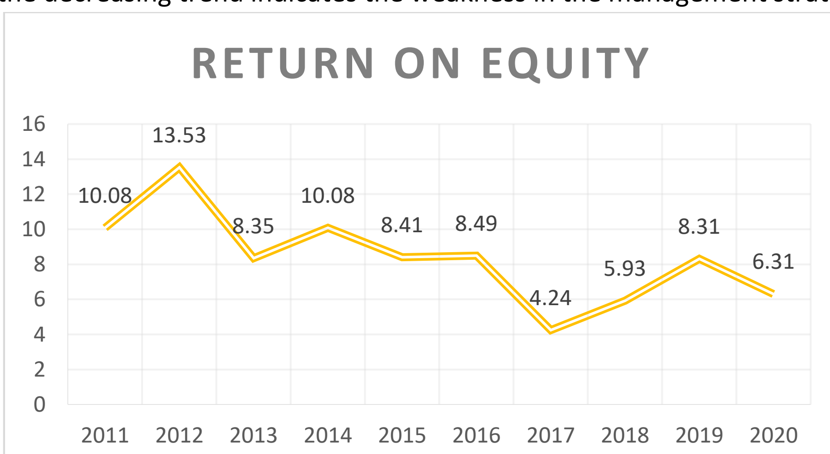

Figure: 4.6

4.7 Net Interest Margin: The differences between total interest earned and interest payout divided average earning assets is the net interest margin. Positive net interest margin suggest that management has taken good decisions regarding lending operations and vice-versa. It is very important to adjust the lending operations to maximize the profitability. At PBL highest net interest margin was 3.81% in 2019 that means the management has good investment decisions whereas at 2015 NIM was .86% which is quite lower.

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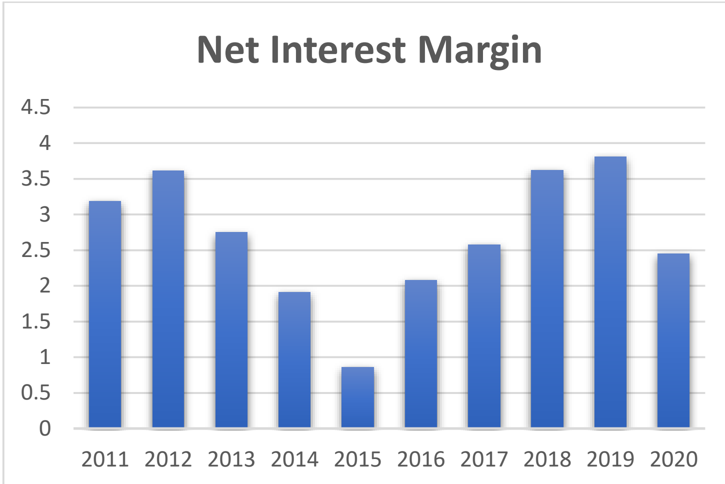

Figure: 4.6

4.7 Equity to debt ratio: It is a leverage ratio which indicates that how a company manages its all short-term and long-term obligations. Total shareholders' equity to total debt is the formula to calculate this ratio.it indicates how the company is earning profit through proper management of debt. Prime Bank's limited equity is very high in relation to debt. Over the last ten years, the equity to debt ratio has slightly increased. From 2013 to 2015, it was in an upward trend because the debt was gradually decreasing. It was in a downward trend from 2015 to 2018 because the debt was rising then.

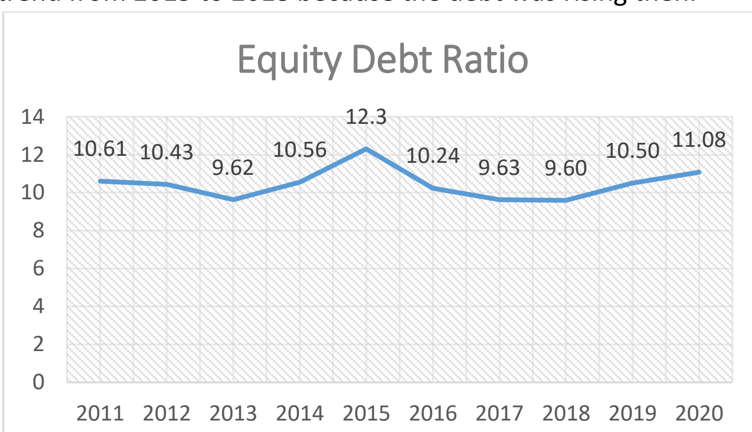

Figure: 4.7

5.0 Regression Analysis

Equation: For the regression analysis, the following equation will be used, which is linear regression model-

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots. + \beta_n X_n + \varepsilon$$

In the above equation,

Y= Net Interest Margin (Dependent variable)

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β= Coefficient of the model
X1 = Loan to Deposit Ratio (Independent Variable)
X2 = Non-performing loan to Total loan (Independent Variable)
X3 = Credit to total asset
X4 = Debt ratio
Є = Standard Error Term

Assumptions: For any kind of analysis model, it is not possible to include all the variables that are related to the dependent variable. Otherwise, the model will become complex and might provide awkward results. Two major assumptions have been made to keep the model simple. These are -

a. All the variables used in the model, that are- NIM, Loan to Deposit Ratio, Non- performing loan to Total loan, Credit to total asset, and the Debt ratio are considered to be not affected by the external economic factors. So, the time effect is thought to be constant.
b. The coefficients within the time period that the data are collected from, that is from the year 2011-2020 are considered to be constant.

Summary Output: First, the model summary regarding R square and Adjusted R square.

Regression Statistics	
Multiple R	0.95
R Square	0.89
Adjusted R Square	0.81
Standard Error	0.41
Observations	10

Model Summary

In the following result, R is the coefficient of the correlation while on the other hand, R Square is known as the coefficient of determination. R is used as a measure for determining the correlation between variables and R Square is used as the proportion of the total variation in the dependent variable Y that is explained by the variation in the independent variable X. From the above result, we can define two things-

a. R= 0.95, representing a strong positive correlation among the variables. That is NIM is positively correlated with Loan to Deposit Ratio, Non-performing loan to Total loan, Credit to total asset, and Debt ratio.
b. R2= 0.89, represents 89% of the variation in NIM is explained by the changes in the four independent variables. In other words, the regression line gives a better fit.

ANOVA Test

The ANOVA test result regarding the analysis is following-

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	7.11	1.78	10.58	0.01
Residual	5	0.84	0.17		
Total	9	7.95			

In the above ANOVA test result, we can reject H0 hypothesis as the P- Value (Sig.) at the last column of the table is 0.01 which is less than α = 0.05. So, H1 is accepted implying there is a significant relationship between NIM and loan to deposit ratio, non-performing loan to total loan, credit to total asset, and debt ratio.

Coefficient

With the help of coefficient, it will be easy to determine for how much unit of NPL or Provision how much sensitive the NPAT is.

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-3.82	2.44	-1.57	0.18
Loan to Deposit Ratio	-1.91	2.61	-0.73	0.50
Non-performing loan to Total loan	-0.08	0.08	-1.01	0.36
Credit to total asset	8.98	4.51	1.99	0.10
Debt ratio	2.85	0.82	3.49	0.02

Overall, we can now plug the data into the equation that was used earlier:

$$Y = -3.82 - 1.91X1 - 0.08X2 + 8.98X3 + 2.85X4 + 0.41$$

From the above equation, we can conclude few things regarding the relationship between NPAT with NPL and Provision-

a. First of all, if the coefficients are zero, Prime Bank will be able to realize a net interest margin of -3.82 regardless of anything.
b. Secondly, the coefficient β1 is –1.91 representing the loan to deposit ratio of Prime Bank. It indicates if loan to deposit ratio is increased (decreased) by 1, NIM will be decreased by 1.91 (increased). This is because there is an inverse relationship between loan to deposit ratio and NIM as increase in this ratio decreases NIM.
c. Thirdly, the coefficient β2 is -0.08 representing the NPL to total loan of Prime Bank. It indicates that if NPL ratio in a certain year is increased by 1 unit, then in the same year NIM will also decrease by 0.08 units. That is also because there is an inverse relationship between NIM and NPL.

d. Fourthly, the coefficient β3 is 8.98 representing the credit to total asset ratio of Prime Bank. It indicates that if credit to total asset ratio is increased (decreased) by 1 unit, NIM will also increase (decrease) by 8.98 units. It means that these two variables have positive relationship.
e. Finally, the coefficient β4 is 2.58 representing the credit to debt ratio of Prime Bank. It indicates that if debt ratio is increased (decreased) by 1 unit, NIM will also increase (decrease) by 2.58 units. It means that debt ratio and NIM also have positive relationship.

6.0 Findings

Every bank has its own credit risk management standard, I have tried my best to gather all the relevant data, analyze those data and find out the true impacts. Data analysis of the report was based on trend analysis and regression analysis of prime bank Ltd. The prime objective of the report was to find out the impact of credit risk management on profitability. Major findings are given below-

a. Credit Risk Grading is one of the vital tools of credit risk management. But often the data is found false and CRG is done based on wrong financial data.
b. The recovery procedure of loans and advances plays a significant role for Prime Bank Limited.
c. The documentation process and documents verification process are very lengthy and sometimes they are often negligent in this section.
d. Their net interest margin rate is very fluctuating. So the effect of net interest margin on profitability is not satisfactory.
e. Loan to deposit ratio is satisfactory as per the previous 10 years, PBL always follows the Bangladesh bank guidelines and didn't adopt aggressive lending.
f. Borrower assessment and loan diversification is not satisfactory.
g. Their Non-Performing Loan rate is decreasing over the years, which is an indicator of good credit risk management.
h. PBL has a satisfactory debt ratio which means they have strong financial health to do business; it explains the good management of economic resources.
i. The percentage of return on assets of PBL is also decreasing which is not satisfactory at all in this competitive market.
j. Credit marketing policies are not as as popular other banks. Like Dutch- Bangla Bank Limited, Brac Bank Limited they have no marketing policies on television and on other media about their new products.
k. The information is not updated on their website available about their strategies, policies, and other activities.
l. PBL has a stable PE ratio during this period with a peak in 2017 which is a good indicator.
m. Equity to debt ratio is also satisfactory but in 2017 and 2018 there was a minor decrease in the ratio.
n. The net interest margin of the bank is more sensitive to changes in credit to total asset ratio.

7.0 Recommendations

Effective credit risk management can increase the profitability of a bank. To solve the major factors of the bank, some recommendations based on my observation are given below-

a. Assessment of Credit Proposal: PBL may be more careful before sanctioning any credit because a fraud proposal can lead to having negative profit for the bank and become a waste of economic resources.
b. Proper documentation: After having the credit proposal the bank can assess all the relevant documents and verify those documents by lawyers and other parties.
c. Assessment of borrower: Though the assessment procedure is lengthy, the background of the borrower, capacity, cash flows, condition collateral, and CIB report must be properly assessed by the bank.
d. Sound Sanctioning: All the bankers, credit committee members, heads of branches can be more careful before sanctioning credit to lessen the non-performing loan rate.
e. Collateral Valuation: The determination of the real market value of the collateral is important to get the loan repayment in case of borrower default. PBL may emphasize more on this issue.
f. Loan review and regular supervision: The purpose of the loan has been executed or not, is the borrower repaying interest regularly those factors must be reviewed. Regular supervision after and before sanction a loan is needed.
g. Loan recovery process: PBL may adopt some new strategies to recover the loan. They can list the non-performing loan list then divide the responsibilities among relationship managers. They may seek help from the Bangladesh Bank regarding the recovery process.
h. Innovative strategies: To make the credit risk management strategies effective, banks can take innovative measures to monitor the loan such as they can hire management outside the company.
i. Proper management: Bank can more emphasize on the credit to the total asset as the non-performing loan is very sensitive to this ratio. To stable the net interest margin strong management can be effective. Regarding this, the bank arranges a seminar or train the member of the management.
j. Risk diversification: To increase the return on assets and net profit banks may identify the capable corporate borrower from different sectors to diversify their risks and make a good combination of the loan portfolios.
k. Working Target: The bank may get more independence in doing business. The credit relationship manager may get all the freedom to choose the customer without having mind pressure. Assigning a fixed target is creating a high loan default rate and non-performing loans.

8.0 Conclusion

In this study, it is found that credit risk management affects much on their profitability. As the lion’s share of the bank's profit depends on its sound lending. If there is a lack of improper credit management, the bank may face losses. Positive impacts of credit risk management on profitability include higher lending rates and sound equity to debt ratio. After analyzing 10 years of data of 9 different types of credit risk management-related ratios and profitability ratios, I have found that there is a strong positive correlation between net interest margin and credit risk management ratios. Net interest margin is more sensitive to credit to total asset ratio. Prime Bank Limited has a very good price-earnings ratio but the percentage of return on asset and return on equity is decreasing day by day because of improper credit management. Because of the negligence of the relationship manager on credit sanctioning the non-performing loan rate is increasing day by day. Prime Bank Limited can take some steps to solve the crisis and earn more profit and contribute to the economy more. This report has taken Prime Bank Limited as a case report to observe its credit-related operation especially the approval process & risk mitigation process. In most of the cases, relevant operations have been found structured except in a few cases. But, Prime Bank Limited requires implementing its existing Credit Policy & Manuals in full phase to make the approval & risk mitigation process more effective with less risk margin. This study takes little data on activities on SME; Consumer Credit & Credit Card financing so further study is required on this specialized credit operation to determine associated credit risk & mitigation steps.

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Appendices

Table-1: Credit Risk Management Related Ratios

Prime Bank Limited	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1. Loan to Deposit Ratio	0.87	0.88	0.76	0.72	0.70	0.75	0.84	0.83	0.80	0.80
2. NPL to Total loan	1.37	3.83	5.09	7.61	7.82	5.96	5.45	6.16	4.66	3.46
3.Credit to total asset	0.69	0.77	0.63	0.58	0.60	0.63	0.71	0.70	0.66	0.67
4.Debt ratio	0.92	0.91	0.91	0.90	0.43	0.91	0.91	0.91	0.91	0.92

Table-2: Profitability Related Ratios

Prime Bank Limited	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1.Return on Asset	2.05	1.20	0.72	0.91	0.80	0.81	0.38	0.76	0.54	0.54
2.Price Earnings Ratio	9.47	12.85	14.57	8.43	8.71	8.31	26.62	9.19	12.38	10.77
3.Return on Equity	10.08	13.53	8.35	10.08	8.41	8.49	4.24	5.93	8.31	6.31
4.Net Interest Margin	3.19	3.61	2.75	1.91	0.86	2.08	2.58	3.62	3.81	2.45
5.Equity debt ratio	10.61	10.43	9.62	10.56	12.30	10.24	9.63	9.60	10.50	11.08