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Evaluating Loan Loss Provisioning for Non-Performing Loans and Its Impact on the Profitability of Commercial Banks in Bangladesh

Fakir Tajul Islam
Assistant Professor
Faculty of Business Administration
Eastern University, Bangladesh
E-mail: ftiprince_gb@yahoo.com

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Abstract
Through the collection and disbursement of money, banks often face the risk of default of the loan. These Non-Performing loans (NPLs) should be identified and cared for avoiding vulnerability to other risk. Banks may mitigate this risk using loan loss provisioning (LLP). Using the aggregate data of 56 commercial banks in the last 9 years (2009-2017), this study attempts to evaluate the Impacts of LLP maintained for NPLs on profitability, as it may help to take the level of the LLP, and NPLs in the optimum level of business success. The dependent variables used in this study are Non-Interest Income to Total Assets and Net-Interest Income to Total Assets as a representative of the profitability of a bank. The dependent variables are analyzed using Least Square Multiple Regression on three independent variables, which were Gross NPL to Total Loans Outstanding, Loan Loss Provision Maintained, and Surplus/ (Shortfall) resulted from the required loan provisioning. The result showed that the profitability is very significantly influenced by the independent variables. NPLs and LLPs maintained by the commercial banks negatively related with the profitability of the business, especially LLPs shown statistical significance to impact on profitability negatively. it is better to take the LLPs and NPLs in the minimum level for maximum profitability of banks.

Keywords: Loan Loss Provisioning, Non-performing Loans, Profitability, Commercial banks, Bangladesh

1. Introduction
Commercial banks do business as an intermediary between depositor and borrower, more specifically; they collect money in exchange of interest on the deposited money and lend the money to other businesses, individuals with interest. The difference between the interest earned and interest paid is the profit or loss for a bank. Banks played important role in economic development through this intermediation service. There is always a chance to be not paid by the borrower as an installment for repaying the borrowed money. And it necessitates the mitigation tools and techniques to report and adjust with the operation smoothly. Nowadays, the level of Non-Performing Loans (NPLs) has been soaring in Bangladesh. NPLs are those selected assets from which bank cannot generate any incoming cash flow as loan repayment installment. In many cases, borrowers become default and the full amount of the loan cannot be recovered. To manage and safeguard the banking business from the NPLs, different credit policies are used, one of those is to increase the loan loss provisions (LLPs). LLPs are used as a cushion to adapt to the expected loss resulted from the missed payment of installment on a bank's loan portfolio; it is interchangeably known as provision for bad debts (Ozili& Outa, 2017).When a bank can predict a loan loss, it needs to be charged to the income statement as "provision" to set a loan loss provision (LLP) account to be shown on the balance sheet. If the principal and interest on a loan becomes bad debts, the amount of the loan balance is decreased by charging it to the LLPs which was kept as a reserve on the balance sheet (Angklomkliew et al., 2009). The banks normally keep

requisite provisions against their unclassified and NPLs from their operating profits in a bid to mitigate financial risks (Islam, 2018). It is important to know that the level of loan loss provisioning able to safeguard the profitability of commercial banks in Bangladesh. As there are many instances that the banks, especially the government owned banks has been facing a large of amount non-performing loan, against which the management of those banks has to maintain large amount of loan loss provision.

2. Related Literature Review and Research Focus

In this section, the usage and concept of LLPs, NPLs, and Profitability are reviewed based on the literature on relevant researches across the world. NLPs and LLPs are the two major transmission channel to give a macroeconomic shock to balance sheet of banks (Monokroussos et al., 2016), as these are the key contributor for resulting fluctuation in the profitability through earnings and capital management (Hoggarth & Pain, 2002). Among the many indicators to understand the strength of lending activity, NLPs to total loans and LLPs to total loans are widely used to measure the credit risk of a bank (Radivojevic & Jovovic, 2017). Lending activity is the major contributor to the profitability and success of banking business in any domain of the world.

Norden & Stoian (2013) conducted a study on 85 Dutch banks to examine the relationship between earnings and risk management. They found that the Dutch banks use loan loss provisioning (LLP) to manage earnings volatility in the banks. The banks usually increase the level of LLPs when the earnings level is higher, and decrease LLPs to adapt with low regulatory capital ratios. In Nigeria, Ozili (2015) investigated banks in Nigeria which focused from 2004 to 2013 period, which reveals that loan loss provisioning largely used for earning smoothing. Similar findings also noticed in a few other researches (Taktak et al., 2010, Curcio et al., 2014, Curcio & Hasan, 2015). Packer and Zhu (2012) did a study on 240 banks of different countries to investigate the loan loss provisioning practices for income smoothing operation with a data set of 2000-2009 time frame. They found that the used of LLPs is also for countercyclical loan loss along with income smoothing. Loan loss provisioning is also used for capital management along with income smoothing as it is a tool to mitigate and caution the risk of default (Perez et al., 2008). So LLPs used for income smoothing, which is a practice for managing profitability.

There few studies which found opposite findings as stated earlier. Bryce et al. (2015) tested the relationship among the income smoothing, capital management and the cyclical hypotheses on Vietnamese banks, but they did not find any significance to use LLPs for income smoothing. Acar and Ipci (2015) investigated the role of LLPs for managing capital and earnings of banks from 2005 to 2011, focusing 28 Turkish banks. They found the use of LLPs for profitability in the form of earning management but this scenario changed during the financial crisis. Abdul Adzis et al. (2016) explored the impact of LLPs on income smoothing on the banks in Hong Kong. Their study revealed that LLPs are used to smooth income but it decreased after the use of IAS 19. Leventis et al. (2011) found the use of LLPs to signaling purposes, along with capital enhancement and income management. Their study was on 91 EU banks who adopted IFRS standards. The adoption of accounting standard caused the change of finding. Their study revealed that the use of LLPs to income smoothing was reduced after enacting IFRS into the banks.

Curcio, De Simone, and Gallo (2017) did a study on the use of discretionary LLPs for income smoothing and profitability. The banks were studied when a financial crisis was in progress; the banks were facing deterioration in loan quality. Their study found that these characteristics caused significant loss of profitability. They also found evidence for income smoothing via LLPs. If the life of a loan is considered, from the sourcing of a loan to the payment of the last installment, there will be a chance of loss always. These losses played a major role in determining the profitability of a bank in the long-run, as the major income generating assets is loan and advances. Rahman (2013) opined that the LLPs may not influence the profitability of a bank in the long run, but it affects the timing of loan losses. He also emphasized on the number of provisions, where a higher provision can cause lack of profitability at present but shifted the future, in case of lower LLPs, the level of profitability will prevail at present by shifting it from future.

For profitability analysis, different measures of evaluation were used in the different study across the world. To represent profitability return of equity, return on assets and earnings per share were used to find out their changes due to the changes in the net liquidity gap on some selected banks in Bangladesh (Islam & Hasan, 2015). Islam, *et* al (2013) had used earnings per share as the agent of performance as well to analyze the performance of banks in Bangladesh. Based on the above literature review outcomes and relevant discussions, it may become useful to give effort to understand and evaluate the LLPs for NPLs for their impact on profitability in the banking system of Bangladesh. So the objective of this empirical study is to understand the LLPs maintained for NPLs by the commercial banks in Bangladesh and then to estimate and evaluate the impact of the LLPs along with NPLs, on the profitability of banks.

It will show us the relationship between loan loss provisioning and profitability in the form of impact analysis and can be used for finding future direction of research in the field of finance and banking.

3. Research Data and Methodology

This study is a quantitative form of research. The data used in this study is mostly historical data. The data used in this research is aggregate data of 56 commercial banks operating in Bangladesh. There are 9 variables used in this study which are collected from the financial stability report of 2010-2017 published by the financial stability department. So the data used in this study has a time frame of 09 years starting from 2009 to 2017.

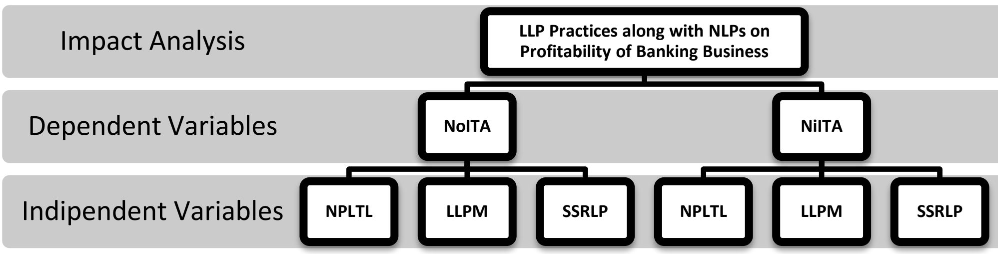

Figure 1. Conceptual framework of Impact analysis on profitability by LLP along with NLPs

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As shown in the above figure, the study has identified two separate segments of profitability of a commercial bank, one is Non-interest segment which are not related to loans and advances and the other one is Net-interest segment which directly related to loans, NPLs, LLPs. For a commercial bank, income can be generated from two different sources, firstly through interest income and secondly, non-interest income from investment in other assets except loan and advances. For this reason, the model to be analyzed is twofold as follows-

NoITA= $\alpha + \beta_1 * NPLTL + \beta_2 * LLPM + \beta_3 * SSRLP + \varepsilon$.. **(1)**

Here, the depended variable is the Non-Interest Income to Total Assets (**NoITA)**, which is the proxy for the profitability of the banking sector in Bangladesh. The independent variables are Gross NPL to Total Loans Outstanding (NPLTL), Loan Loss Provision Maintained (LLPM), and Surplus/(Shortfall) resulted from the required loan provisioning (SSRLP), and the error terms.

NiITA= $\alpha + \beta_1 * NPLTL + \beta_2 * LLPM + \beta_3 * SSRLP + \varepsilon$.. **(2)**

Here in the second model, the dependent variable changed to Net-Interest Income to Total Assets (**NiITA)**. It is changed to find out the direct impact on the loan and advances which is the major sources of income of a bank for ensuring profitability and successful business venture. The independent variables are as same as used in the model-1. Net-interest Income is calculated by subtracting Interest expense from interest income. The data analyzed using descriptive statistics and ordinary least square regression method is used to determine the effect of dependent variables on the independent variables in the regression equation. There are also some used of tables and charts for understanding the initial part of this research on LLPs, NPLs and profitability.

4. Research Findings and Analysis

In the analysis part, the key terms of the research are explored form the historical data and analyzed using tabular and graphical analysis. Later the impact analysis is discussed and then it forwarded to the evaluation of the current state of LLPs, NPLs, and profitability of banks in Bangladesh.

4.1 Descriptive Statistics of the Variables used in the Study

For profitability analysis, there are various financial ratios to use and there are different measures of NPLs and LLPs are also available. In the following table, there are three measures of profitability listed which includes ROA, ROE, NiITA, NoITA, and NIM.

Table 1: Descriptive statistics of the variables

	N	Minimum	Maximum	Mean	Std. Deviation
Bad Loans to Gross NPLs (%)	9	66.70	87.00	78.9444	6.17781
Doubtful Loans to Gross NPLs (%)	9	5.40	14.20	9.0222	2.98989
Interest Income to Total Assets (%)	9	5.40	8.10	6.7589	.93766
Provision Maintained (in millions crore BDT)	9	137.80	375.30	2.3372E2	82.87965
Net Interest Margin (NIM)	9	1.70	3.05	2.3267	.53388
Net- Interest Income to Total Assets (NiITA)	9	1.50	2.50	1.9178	.42349
Non-Interest Income to Total Assets (NoITA)	9	2.20	3.40	2.7567	.34409
Gross NPL to Total Loans (%)	9	6.20	10.00	8.7111	1.24544
Operating Profit before Provision ((In Billion BDT)	9	116.25	246.50	1.9439E2	36.76938
Return on Assets (ROA)	9	.60	1.72	.9778	.39185
Return on Equity (ROE)	9	7.80	19.89	12.2389	4.71644
Required Provision	9	134.70	443.00	2.5813E2	105.89509
Sub-Standard Loans to Gross NPL (%)	9	7.50	19.10	12.0333	3.44565
Valid N (listwise)	9				

Source: Author's analysis using SPSS v16.0.

For NPLs, there are four variables listed which include Bad loans, doubtful loans and sub-standard loans to total NPLs, NPLs to total loans outstanding by the all banks in banks in Bangladesh. For LLPs, there are two variables, includes required provisions as per the amount of NPLs, provision maintained. In the later analysis, all the variables cannot be accommodated due to the simplicity of the research.

4.2 LLP, NPL and Profitability in the Banking Sector in Bangladesh

The amount of NPLs was downward from 2008 to 2011, and then it went up for the year 2012 (Figure 2). From 2013, the NPLs percentage of total loans has been a bit stable between 8 to 10 percent of the total loans outstanding by the banks in Bangladesh. The lowest percentage found in 2011, which was 6.2%. Then it soared up a bit before stabilizing to this current state.

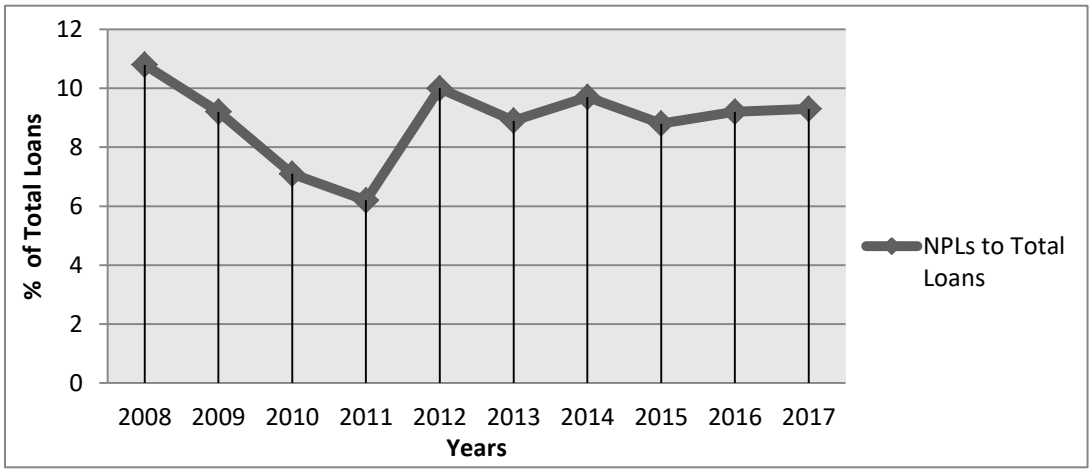

Figure 2. NPLs as a percentage of total loans outstanding during 2008 to 2017 (Bangladesh Bank 2018)

The NPLs is classified into three categories by the central bank of Bangladesh. If a loan remains outstanding for 6 months, it is marked as "Sub-Standard (SS)" while for 9 months and 12 months of outstanding loans, classification are "Doubtful (DF)" and "Bad Loan (BL)" respectively. Even the range of what could be called a bad loan was narrowed down through the new regulation which has put three months' outstanding loans in SS category, six months' outstanding in DF and nine months' outstanding in BL categories (Tuhin, A. 2018). In the following figure (Figure 3), the progression of the three types of NPLs are depicted-

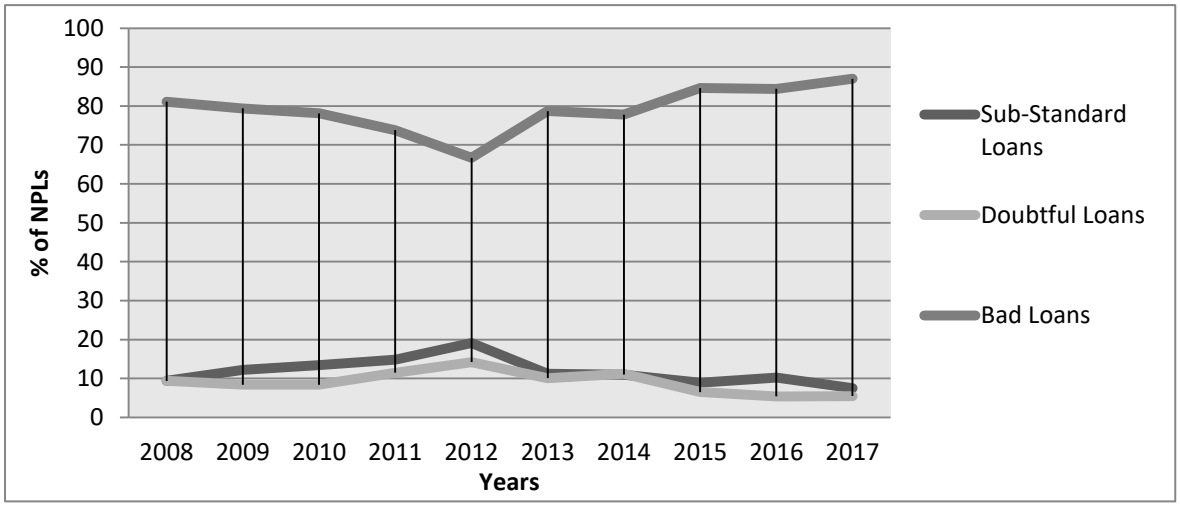

Figure 3.Non-Performing Loans (NPLs) composition during 2008 to 2017(Bangladesh Bank 2018)

Under the existing Bangladesh Bank regulations, the banks have to keep 0.25 percent to 5.0 percent provisions against general-category loans, 20 percent provision against substandard category, 50 percent against doubtful loans and 100 percent against bad or loss category (Islam, S. 2018; Tuhin, A. 2018).

Table 2: banking sector loan provisions (in millions crore taka)

Year	Required Provision	Provision Maintained	Surplus/(Shortfall)
2009	134.7	137.8	3.1
2010	150.8	146.8	(3.9)
2011	139.3	148.9	9.6
2012	242.4	189.8	(52.6)
2013	252.4	249.8	(2.6)
2014	289.6	281.6	(8)
2015	308.9	266.1	42.8
2016	362.1	307.4	(54.7)
2017	443	375.3	(67.7)

Source: Financial Stability Reports 2010-2017(Bangladesh Bank, 2018)

The above table (Table 4) gives an indication that the banks could not keep their LLPs in the required level in most of the last ten years. In some years, the difference between the required LLPs and LLPs maintained is large enough to alarm for taking safety measures. So the above two tables showed that the NPLs caused LLPs and in most of the years from 2009 to 2017, the required LLPs could not be made. Moreover, the LLPs can cause lack of profitability as the bad debt and its provision may increase operational expenses and weaken the balance sheet by reducing its reserve on the provision. As it is shown in the following table (Table 3), in the years of LLPs shortfall, the profitability indicators were weak enough for the influence of the LLPs caused by NLPs.

Table 3: Profitability of Banking Sector of Bangladesh (in Percentage)

Years	ROA	ROE	Net Interest Margin	Operating Profit before provision (In Billion BDT)
2009	1.38	19.86	2.59	116.25
2010	1.72	19.89	3.05	170.92
2011	1.3	14.3	3	186.8
2012	0.6	7.8	2.8	197.3
2013	0.9	10.7	2.1	186.1
2014	0.7	8.1	1.8	212.7
2015	0.8	9.4	1.7	216.9
2016	0.7	9.7	1.9	216
2017	0.7	10.40	2.00	246.50

Source: Financial Stability Reports 2010-2017(Bangladesh Bank 2018).

The above table indicates that the measure of profitability is giving mixed performance level which meant the assets and equity are not good enough for the high level of performance, but the other measures have good indication of profitability. There are many issues underlies for the mixed result of performance.

4.3 Test of Impacts of LLPs for NPLs on Profitability

For a commercial bank, income can be generated from two different sources, firstly through interest income and secondly, non-interest income from investment in other assets except loan and advances. For this reason, the model to be analyzed is twofold as follows-

$$\text{NiITA} = \alpha + \beta_1 * NPLTL + \beta_2 * LLPM + \beta_3 * SSRLP + \varepsilon \quad \text{.....(1)}$$

Here, the depended variable is the Non-Interest Income to Total Assets, which is the proxy for the profitability of the banking sector in Bangladesh. The independent variables are Gross NPL to Total Loans Outstanding (NPLTL), Loan Loss Provision Maintained (LLPM), and Surplus/(Shortfall) resulted from the required loan provisioning (SSRLP), and the error terms.

Model-1 Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.886[a]	.785	.656	.20175

a. Predictors: (Constant), Surplus/(Shortfall), Gross NPL to Total Loans Outstanding, Provision Maintained

Source: Author's analysis using SPSS v16.0.

As it is shown in the model-1 summary, it indicates that the independent variables are highly correlated with the dependent variable and it is 0.886 (the 'R' value). Based on the R Square value, 78.50% variation in the dependent variable is explained by the Gross NPL to Total Loans Outstanding (NPLTL), Loan Loss Provision Maintained (LLPM), and Surplus/(Shortfall) resulted from the required loan provisioning (SSRLP).

ANOVA[b]

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.744	3	.248	6.090	.040[a]
	Residual	.204	5	.041		
	Total	.947	8			

a. Predictors: (Constant), Surplus/(Shortfall), Gross NPL to Total Loans Outstanding, Provision Maintained
b. Dependent Variable: Non-Interest Income to Total Assets

Source: Author's analysis using SPSS v16.0.

The regression model-1 predicts the variation of the dependent variable, significantly well, as it has an acceptable level of significance to be statistically significant and good fit for the data.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.567	.578		6.171	.002
	Gross NPL to Total Loans Outstanding	-.014	.070	-.050	-.198	.851
	Provision Maintained	-.003	.001	-.626	-2.087	.041
	Surplus/(Shortfall)	.003	.004	.291	.942	.390

Dependent Variable: Non-Interest Income to Total Assets

Source: Author's analysis using SPSS v16.0.

The analysis of coefficients shows how much influence is exerted by the independent variables, namely the Gross NPL to Total Loans Outstanding (NPLTL), Loan Loss Provision Maintained (LLPM), and Surplus/(Shortfall) resulted from the required loan provisioning (SSRLP) on the dependent variables, Non-Interest Income to Total Assets. The first two variables showed negative relationship with the dependent variable. Among the independent variables only Loan Loss Provision Maintained (LLPM) found statistically significant. Thus the regression equation now become as follows-

NoiITA= $\mathbf{3.567 + (-0.014) * \mathit{NPLTL} + (-0.003) * \mathit{LLPM} + (0.003) * \mathit{SSRLP} + \varepsilon}$**………………………(1)**

In the earlier model, the dependent variable was Non-Interest Income to Total Assets (**NoiITA**), now in the second model, the dependent variable change to Net-Interest Income to Total Assets (**NiITA**) to find the strength of influence of the same independent variable used in Model-1, to influence a dependent variable which is directly related with the loan and advances, Non-Performing loans (NLPs) and Loan Loss Provisioning (LLP). The Model-2 designed as follows-

NiITA= $\boldsymbol{\alpha + \beta_1 * NPLTL + \beta_2 * LLPM + \beta_3 * SSRLP + \varepsilon}$**…………………………………………………(2)**

As stated earlier, that the second model has one change in the dependent variable but the other variables are the same as Model-1. After testing the variables in the SPSS v16.0, the results found as follows.

Model -2 Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.907[a]	.823	.717	.22543

a. Predictors: (Constant), Surplus/(Shortfall), Gross NPL to Total Loans Outstanding, Provision Maintained

Source: Author's analysis using SPSS v16.0.

As it is shown in the model-2 summary, it indicates that the independent variables are highly correlated with the dependent variable and it is 0.907 (the 'R' value). Based on the R Square value generated in the test, 82.30% variation in the 'Net-interest income to total assets' is explained by the three independent variables. The adjusted R Square value is found very useful which is "71.70 percent". The model-2 showed the findings noteworthy enough in comparison to model-1. Though both models are aimed at a same set of independent variables. The regression model-2 predicts the variation of the dependent variable, also significantly well, as it has an acceptable level of significance (0.25) to be statistically significant and good fit for the data.

ANOVA[b]

	Model	Sum of Squares	df	Mean Square	F	Sig.
2	Regression	1.181	3	.394	7.744	.025[a]
	Residual	.254	5	.051		
	Total	1.435	8			

a. Predictors: (Constant), Surplus/(Shortfall), Gross NPL to Total Loans Outstanding, Provision Maintained
b. Dependent Variable: Net- Interest Income to Total Assets

Source: Author's analysis using SPSS v16.0.

The analysis of coefficients shows how much influence is exerted by the new dependent variable on the three independent variables.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
2	(Constant)	4.026	.646		6.232	.002
	Gross NPL to Total Loans Outstanding	-.135	.078	-.396	-1.717	.147
	Provision Maintained	-.005	.001	-.889	-3.266	.022
	Surplus/(Shortfall)	-.005	.004	-.363	-1.294	.252

a. Dependent Variable: Net- Interest Income to Total Assets

Source: Author's analysis using SPSS v16.0.

In this Model-2, based on the value of coefficients, the first two variables showed the negative relationship with the dependent variable again. Among the three independent variables, only Loan Loss Provision Maintained (LLPM) found statistically significant which is the same as Model-1.

$$\textbf{NeITA=}\ 4.026 + (-0.135) * \boldsymbol{NPLTL} + (-0.005) * \boldsymbol{LLPM} + (-0.005) * \boldsymbol{SSRLP} + \boldsymbol{\varepsilon} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\textbf{(2)}$$

In both regression models, the association of independent variables with the dependent variable has shown statistical significance. Among the independent variables, Loan Loss Provision Maintained (LLPM) found statistically significant to explain the variation in Non-Interest Income to Total Assets (Model-1) and in Net-Interest Income to Total Assets (Model-2).

5. Conclusion

The evaluation of the research findings showed that the level of NPLs was favorable during 2008 to 2011, and from 2013, the NPLs percentage of total loans has been a bit stable between 8 to 10 percent of the total loans outstanding. The banks could not keep their LLPs in the required level in most of the last ten years. In some years, the difference between the required LLPs and LLPs maintained is large enough to alarm for safety measures. The measure of profitability is giving mixed performance level which meant the assets and equity are not good enough for the high level of performance, but the other measures have a good indication of profitability. There are many issues underlies for the mixed result of performance. With taking care of it, the relevant authorities should try to minimize it to ensure better profitability. The high percentage of NPLs caused high LLPs and it can reduce profitability as found in the study. Based on the findings and evaluation, it is found the research could be more in-depth with adding more literature and variables. So it creates scope for further research on this research topic.

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