Non-Performing Assets of State Bank of India: An Empirical Analysis

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ABSTRACT

Indian banking sector has witnessed steep increase in level of non-performing assets (NPA) along with growth of banking sector and economy as a whole. Non-performing Assets of State Bank of India, which is the largest public sector bank of India, has doubled over past 10 years. It has grown significantly in past 2 decades but the financial performance of the bank has deteriorated drastically during the period 2009-10 to 2019-20. For this paper statistical techniques of Person's correlation and multiple & stepwise models of regression have been employed for establishing the influence of NPA on the profitability of State Bank of India. Among the bank-specific determinants, return on net worth has shown a significant negative correlation with gross NPA and net NPA, whereas provision coverage ratio has shown an insignificant relationship with profitability. Moreover, the stepwise regression model indicated that gross NPA is the single most significant factor affecting the profitability, suggesting that the gross NPA is more intrinsic than the other selected NPA indicators.

Keywords

Non-Performing Assets, NPA, Pearson's Correlation, Regression, State Bank of India, SBI
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Introduction

State Bank of India (SBI), Indian subcontinent's oldest commercial bank with a legacy of over 200 years, was first established in 1806 as Bank of Calcutta. SBI is a public sector bank that offers an extensive range of banking services and products to all categories of banking uses like individuals, various business enterprises, big corporates, public sector entities, and large institutional customers using its large infrastructure of branches across India and overseas. SBI is currently a multinational, public sector bank and financial services organization with the head office based in Mumbai, it has over 22,141 branches and 58,555 ATMs serving 44.89 crore customers with annual revenue of Rs. 3025 billion for 2019-20. State Bank of India's market share is 22.38% in deposits and 20.09% in advances as reported in its annual report (SBI, 2020). The bank is ranked 221 with a revenue of USD 51,091 Million on the Fortune Global 500 list of the world's largest companies for the year 2020 (Fortune Global500, 2020). Hence, SBI controls more than one-fifth of Indian Banking sector and is the undisputedly largest bank in India.

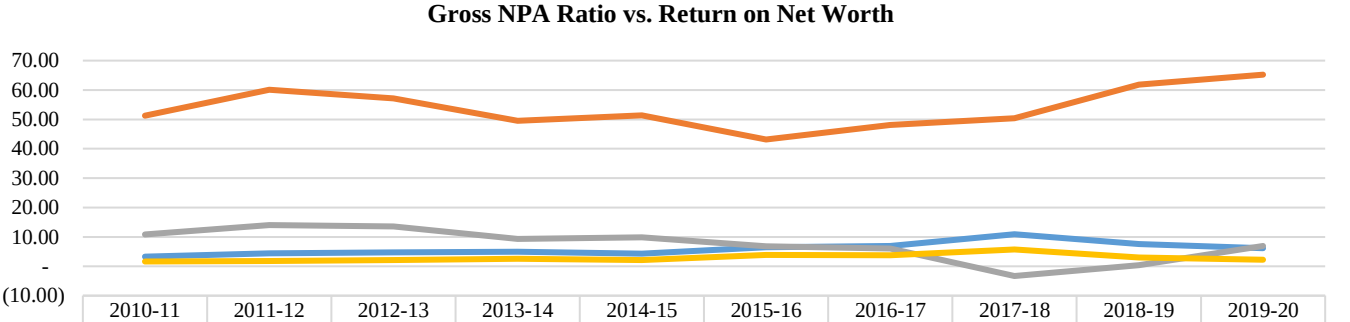
The importance and necessity of a strong and reliable banking system in India were comprehended in the period after independence and therefore, restructuring of the bank into nationalized or public sector banks was done to accomplish wider objectives of the economy (Deb, 1988; Chhipa, 1987). The Government of India, alongwith the nationalization, issued the directives to banks to expand their base by establishing the business in the rural areas to focus on various priority sectors like small scale industries, agriculture etc. In 1990, the Government of India embarked on a liberalization policy by giving licenses to a number of private banks. However, at that time the global banking industry was facing a major crisis and the Indian banks were not spared as well, which led to an increase in non-performing assets (NPA). Various factors which includes internal factors like flawed lending procedure, bad credit decision like not following various principles like principles of safety, liquidity management and principle of productivity inadequate strength and weakness analysis, lack of regular field visits, defective credit appraisal system, , unsuitable technology, supervisory insufficiencies etc. and various external factors like unproductive recovery processes, natural disasters, intentional defaults, reducing demand, industrial sickness, changing government rules etc., have contributed to the escalation of NPA of banks in India (Sikdar & Makkad 2015).

The Securitization and Reconstruction of Financial Assets and Enforcement of Security

Interest Act, 2002 (SARFAESI Act) defined NPA by way of a borrower's account that is classified by a bank as a substandard asset or doubtful asset or loss asset as per RBI guidelines. Until 2004, any loan which was overdue for more than 180 days was considered as NPA, which was later reduced to 90 days.

NPA brings huge credit risk and liquidity risk for the banks, which if not managed efficiently, may lead to serious consequences. Reserve Bank of India has taken many robust initiative centered on the Narsimahan Committee's recommendations that changed the landscape of the banking sector in India. Strict measures like capital adequacy ratio, assets classification, provisioning of NPA, enforcing compliance with accounting standards, following standardized disclosure requirements and transparency of banks' financial statements has been undertaken to reduce the volume of NPA. With the magnitude of the problem and steps taken by regulatory bodies across the globe, many researchers developed an interest to analyze and measure the performance of Indian banks, results of these researches showed that the high NPA volume significantly impact on the profitability of banks negatively (Purohit et al. , 2003; Reddy, 2004: Mohanty, 2006; Hosmani & Hudagi, 2011; Banerjee and Mitra, 2018; Agarwala & Agarwala, 2019; Nachimuthu & Veni, 2019).

The NPA data from 2010-11 to 2019-20, as presented in Fig. 1 below, indicated that GNPA of SBI continuously increased from 3.28% to 6.15% as shown in Graph 1. Similarly, NNPA has increased from 1.63% to 2.23% during the same period. The RNW has reduced from 10.81% in 2010-11 to 6.96% in 2019-20. It can be noted that PCR has increased with an increase in the GNPA ratio indicating that banks are making more provisions against their increasing GNPA and NNPA having impact on net profits.



	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
GNPA	3.28	4.44	4.75	4.95	4.25	6.50	6.90	10.91	7.53	6.15
RNW	10.81	14.03	13.57	9.30	9.83	6.76	6.09	(3.31)	0.37	6.96
PCR	51.25	60.13	57.11	49.52	51.36	43.15	48.13	50.38	61.86	65.21
NNPA	1.63	1.82	2.10	2.57	2.12	3.81	3.71	5.73	3.01	2.23

Fig 1 - NPA & Profitability Trends of SBI

Source: Compiled using data retrieved from RBI's webpage named "Statistical Tables relating to Banks in India: 2019-20"

The above set of data and trends in Fig. 1 above kindled our interest to establish the relationship between NPA and the influence that it makes on the profitability of SBI for the period 2010-11 to 2019-20.

The objectives of this paper are multi-faceted. Firstly, exploring the connection between NPA and profitability of SBI. Secondly, the study will identify which NPA indicator amongst GNPA, NNPA and PCR have maximum impact on the profitability of SBI.

In this paper, Section 2 presents a comprehensive review of literature on the relationship of NPA with profitability. Section 3 shows the details of the methodology followed, data collection. The result and discussions has been shown in Section 4. Section 5 deliberates a conclusion to the study, the practical implications and future research avenues.

Review of Literature

NPA Studies on Banks in India

Michael et. al. (2006) while studying the correlation between NPA and financial performance of cooperative banks in India highlighted that NPA negatively impacts the liquidity, financial performance and creditworthiness position of the banks, in addition to operative productivity and subsistence of banks. In their study, which compared public sector and private sectors banks in India, Arora and Ostwal (2014), using ratio analysis concluded that PSBs and financial experience a higher level of NPA in comparison to private banks. The study also indicated that NPA adversely impacts bank's financial performance, growth and stability, due to an increase in doubtful debt provisions and writing off of bad debts.

Tripathi et. al. (2014) conducted a study comparing State Bank of India Group and Nationalized Banks Group by applying multiple regression technique to study the influence of NPA on the priority sector advances, advances made to other vulnerable sectors, unsecured advances etc. and suggested that advances to these sectors are negatively correlated to GNPA.

The study conducted by Kiran & Jones (2016), on seven Indian banks including SBI for the period 2005 to 2014, by employing regression and correlation techniques, has revealed an adverse relationship between the GNPA and net profits. Following an empirical approach to study of various profitability indicators with a focus on NPA of Indian commercial banks, Rajput et. al. (2012) established that NPA have an adverse effect on the financial performance of the banking institutions. However, Parmar (2014) for his study covering State Bank of India & ICICI Bank found an adverse relationship among Net non-performing assets and profitability of ICICI but the relationship was found to be positive in the case of SBI. Similarly, Dudhe (2017) in his study on seven public sector banks namely SBI, PNB, Bank of Baroda, Indian Overseas Bank, Central Bank of India, Bank of India and Union Bank of India using panel regression showed that except for SBI & Punjab National Bank, all other banks under study have shown an adverse relationship among GNPA and net profits. The SBI & Punjab National Bank exhibited a positive relationship between GNPA and net profits as profits for both the banks were increasing as these banks paid more attention to recover their NPA.

Sheeba (2017) studied the effect of credit risk on the profitability of State Bank of India by analyzing the 20 years data, i.e. from 1997 to 2016 using credit risk indicators like capital adequacy ratio (CAR), loan to deposit ratio (LTDR), NPA ratio, cost to loan ratio (CLR), PCR, leverage ratio (LR) & NPA to total assets ratio (NPTA) and profitability indicator as return on equity (ROE). The researcher used multiple regression and found that while NPTA has a statically significant impact on ROE, but the rest of the indicators including PCR and NPA ratio was not having statistically significant effect on ROE. Another similar study by Maali & Khan (2018) using data from 2003-17 of SBI, employing statistical techniques of multiple regression and graphical description, to ascertain the impact of various factors like NPA, CAR, PCR, LR and problem assets ratio (PAR) on profitability i.e. ROE was conducted. It was found that PAR and LR had a substantial negative impact on profitability whereas rest of the factors namely NPA, CAR and PCR were not seems to have a significant effect on ROE.

Agarwala & Agarwala (2019) in their study on Public Sector and Private Sector Banks in India analyzing the impact of NPA on profitability using geometric mean suggested that rising NPA doesn't just impacts the level of profitability of the banks, it also adversely impacts the shareholders' equity. A similar study by Banerjee and Mitra (2018), on all Public and Private Indian banks, concluded that NPA does haves a straight adverse bearing on profitability, solvency and liquidity for the banks. Nachimuthu & Veni (2019) in their study related to banks analysis the data for a period of 10 years from the year 2007 to 2017 using regression analysis, test of equality of means, cross correlogram and ratio analysis and reached at the conclusion that NPA has a negative effect on the financial performance of banks. A study by Hosmani and Hudagi (2011) on nonperforming assets of Public Sector Banks (PSB) in India, found that the quantum of NPA is alarming having a negative impact on the financial health of the banks in respect of financial

performance, economies of scale in operation and liquidity.

NPA Studies on Banks across the World

A study by Le (2016) on the impact of non-performing assets on the profitability of Greek banks showed that an increase in NPA led to higher bad debts provisions, reduced profitability, sizable corrosion in bank's equity and adverse impact on the future lending ability of the banks. Athanasoglou et. al. (2008) revealed that the poor quality of loans results in a reduction of interest income, hence in his study on a panel of Greek banks, the researcher reached at the conclusion that NPA have a negative impact on financial performance of the banks.

Kaaya & Pastory (2013), in their study, have established an adverse association between NPA and the financial performance of the banks in Tanzania. Kingu et. al. (2018) investigated the effect of NPA on financial performance of banks by employing techniques of information asymmetry theory and poor management assumption and concluded that the existence of NPA is adversely connected to the profitability of Tanzania's banks. Balango & Rao (2017)'s findings showed a negative correlation between financial performance and NPA of banks in Ethiopia.

Using time-series data, Lata (2015) had concluded that the increase in NPA is the most prominent of the factors in state-owned banks in Bangladesh that impacts the profitability of the banks which affects the net interest revenue as well. Akter and Roy (2017) noted the adverse effect of NPA on profitability and net interest spread while considering data of 30 Bangladeshi banks during 2008 to 2013. The research paper also attempted to establish the time series scenario of non-performing assets, its increase, provisions and correlation with banks' financial performance by analyzing various financial ratios alongwith a linear regression model and concluded that NPA is a major factor influencing the financial performance of the banks with a significant adverse effect on net profit statistically.

Banker et al. (2010) used a panel dataset on fourteen banks of Korea covering the period 1995 to 2005 and established that the NPA ratio has an adverse impact on the productivity of the banks. A study by Trujillo-Ponce (2013), on 89 commercial banks in Spain during the period 1999 to 2009 using unbalanced panel data and Generalized Method of Moments (GMM) showed that NPA has adverse effects on the return of assets of the banks. Pham (2013) assessed the impact of NPA on the profitability of commercial banks operating in Vietnam between the period 2005 to 2012 and the outcomes supported the finding that NPA has a statistically significant and adverse relation with profitability ratios.

In a study on NPL in Italy, Sergio (1996) suggested that the bank's lending policy without adequate assessment of sectoral prospects was responsible for increased risk of loan assets. This study also established that business cycles can be one of the reasons for NPL but not the sole reason. Chijoriga (2000) conducted a study on Tanzanian banks that has shown the correlation between the bank's failure and the higher level of NPA. Panta (2007) in his article on challenges in the Nepalese banking sector with an analysis of other Asian markets like India, China and Bangladesh, observed that banks generally took various measures to control level of NPA to improve the financial performance position as the correlation amount NPA and the banks' failure is very all over the world.

Tole et. al. (2015) have scrutinized the impact of credit risk on the profitability of the commercial banks by employing descriptive statistics and penal data regression analysis on eight Ethiopian Banks from the period of 12 years from 2003 to 2012. They used ROE (return on equity) and ROA (return on assets) as indicators of profitability and nonperforming loan ratio (NPL), capital adequacy ratio (CAR), loans and advances to deposit ratio (LTDR) and loan loss provision ratio (i.e. PCR) as credit risk indicators. It was concluded that NPL, CAR & PCR have a strong and statistically significant effect on the profitability of Ethiopian commercial banks.

Numeral researchers around the world have established that increasing NPA leads to decreasing profitability of the commercial banks (Girardone et al, 2004; Altunbas et al., 2000; Berger and DeYoung, 1997; Karim, 2010; Kwan & Eisenia's, 1995), and the findings of these studies support the hypothesis that the efficient banks can handle their credit risks better.

In sum, it appears that there is little research with respect to NPA of State Bank of India in comparison to other Indian banks but none analyzing the impact of NPA on the financial performance i.e. profitability of State Bank of India across 2010-11 to 2019-20. Also, as observed from the above literature, researchers have used various NPA indicators such as GNPA, NNPA, PCR, etc. to identify the correlation between NPA and profitability of banks. However, none of these studies have attempted to identify the most significant NPA indicator demonstrating the strongest relationship with the profitability of a bank. Against this backdrop, this research has been conducted to fill up this glaring gap.

Methodology

For the purpose of this paper, data from secondary sources has been used, mainly extracted from the various Annual Financial Reports of SBI for the year 2010-11 to 2019-20. In this study, RNW will be considered as the dependent profitability variable in line with the study by Raval (2014) while GNPA, NNPA and PCR have been considered as the predictor variables or independent variables in line with studies by various researchers like Kiran & Jones (2016), Sheeba (2017), Murari (2014), as enumerated in Table 1 below.

Table 1 - Variables Used for Regression Analysis

Factors	Variables	Description
Independent Variables		
Non-performing Assets	GNPA ratio	GNPA/Gross Advances
	NNPA Ratio	NNPA/Net Advances
	PCR	Total Provision/GNPA
Dependent Variables		
Profitability	RNW	Net Profit/ Net Worth

Statistical Tools and Techniques of Analysis

Statistical techniques of Correlation together with Multiple Regression approach for analyzing the data selected for this study have been used in line with similar studies by researchers like Rajput et. al., 2012; Yadav, 2011; Dash & Kabra, 2010; Siraj & Pillai, 2012). SPSS statistics software has been extensively used for the purpose of statistical calculations.

Correlation Analysis: Using all the independent and dependent variables chosen for this study, the Bivariate Correlation computes the association between all pairs and provides a matrix of coefficients. This matrix is used to determine the direction along with strength of the correlation between each pair of variables. Pearson's correlation coefficient table demonstrates correlation coefficients value of which range between negative 1 (-1 show a perfect negative correlation) whereas positive 1 (+1 a perfect positive correlation). When the correlation coefficient is Zero (0), it indicated that there is no linear correlation.

Multiple Regression Analysis: Multiple Regression Analysis, a popular technique of statistics, analyses the linear relationship among various the dependent variables and independent/predictor variables. It calculates the coefficients of each pair to achieve a linear i.e. straight line equation. For analyzing the data for this study, we have assumed that the relationship between the dependent variable and each independent/predictor variable is linear i,e. straight-line using linear regression model.

Stepwise regression – Stepwise regression method identifies the single most important variable which has the strongest relationship with the dependent variable. This will help to identify the most important NPA factor from GNPA, NNPA or PCR, impacting the profitability of the bank.

Hypotheses of the Study

For examining the effect and strength of effect of NPA on the financial performance i.e. profitability of India's largest public sector bank, SBI, the following hypotheses are being tested: -

H0: Null Hypotheses – It assumes that no significant impact of NPA on the profitability of SBI exists during 2010-11 to 2019-20

H1: Alternative Hypotheses - It assumes that a significant impact of NPA on the profitability of SBI exists during 2010-11 to 2019-20

Results and Discussion

Pearson's correlation: Table 2 below shows the outcomes of correlation analysis between NPA

indicators and various profitability indicators during the period of study: -

Table 2 - Correlation Coefficients of NPA Indicators with Profitability Ratios

		GNPA ratio	NNPA ratio	PCR	RNW
GNPA ratio	Pearson's Correlation	1	.933**	-.084	-.914**
	Sig (2-tailed)		.000	.818	.000
	N = Number of years	10	10	10	10
NNPA ratio	Pearson's Correlation	.933**	1	-.430	-.834**
	Sig (2-tailed)	.000		.215	.003
	N = Number of years	10	10	10	10
PCR	Pearson's Correlation	-.084	-.430	1	.084
	Sig (2-tailed)	.818	.215		.817
	N = Number of years	10	10	10	10
RNW	Pearson's Correlation	-.914**	-.834**	.084	1
	Sig (2-tailed)	.000	.003	.817	
	N = Number of years	10	10	10	10

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Table 2 above indicates that Pearson's correlation coefficients of the GNPA ratio and RNW are -0.914 at a significance level of 5%. The relationship is negative (-0.914), which means that an increase in the GNPA ratio will result in a fall in RNW and vice versa in line with the study conducted by Chellasamy & Prema (2018). Moreover, the correlation coefficient of NNPA and RNW is - 0.834 at 0.01 significance level indicating a strong adverse correlation between the independent and dependent variables, in line with findings of a study by Chellasamy & Prema (2018). Hence, Pearson's correlation clearly shows that the higher the ratio of GNPA and NNPA for SBI, the lower is the RNW. Higher GNPA and NNPA reflect the poor quality of credit extended by banks, which results in non-standard assets leading to higher provisioning for NPA hence leading to a decrease in profits. Further, NPA restricts cash flows as the funds are blocked in these assets resulting in loss of opportunity costs of these funds, which would have otherwise generated income. Moreover, the cost of capital has to be borne by the bank. Hence NPA not only impacts profitability, it also reduces the liquidity of the bank which is as concluded in the study conducted by Michael et. al. (2006).

On the other hand, the Pearson correlation coefficients of the PCR show insignificant relation with RNW of SBI (.084), corroborates with the results of studies by Sheeba (2017) & Maali & Khan (2018).

Multiple Regression Analysis

For the purpose of this study, statistical technique of Multiple Regression Analysis has been applied to investigate the impact of an increase in NPA in banks portfolios on its financial performance. Therefore, to examine the effect of NPA on the profitability of SBI, NPA indicators have been used as an independent variable. These independent variables includes Gross NPA ratio calculated as % of gross advances (GNPA), Net NPA ratio calculated as % of net advances (NNPA) and Provision Coverage Ratio calculated as % of Gross NPA (PCR) measuring the level of non-performing assets. Return on Net worth (RNW) has been considered as profitability indicator which is the dependent variable. The sampling period is a period of ten years starting from 2010-11 to 2019-20. Multiple regression analysis has been performed for each NPA indicator. As a first step, we will incorporate the following equation of a bivariate regression model using the equation as given below:

D1 = x + y1V1 + y2 V2 + y3 V3 + u----------

Where D= RNW,

V1= GNPA Ratio;

V2= NNPA Ratio

V3= PCR

x = intercept, y = regression parameter; u = standard error.

Table 3 & 3.1 below presents the output of Bivariate regression for the effect of NPA on the financial performance i.e. profitability indicated by RNW of SBI which has been obtained using SPSS software.

Table 3 - Impact of NPA on Profitability: Bivariate Regress Coefficients

MODEL		COEFFICIENTS (UNSTANDARDISED)	STD. ERROR	COEFFICIENTS (STANDARDISED) BETA	T-value	SIG
1	(Constant)	-52.030	20.833		-2.497	.047
	GNPA ratio	-13.941	3.271	-5.573	-4.262	.005
	NNPA ratio	22.564	6.316	5.157	3.573	.012
	PCR	1.446	.410	1.835	3.528	.012
a. Dependent Variable: Return on Net Worth						

Table 3.1 - Model Summary

Model	R	R Square	R Square (Adjusted)	Standard Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.973a	.947	.921	1.53989	.947	35.898	3	6	.000

a. Predictors: (Constant) GNPA, NNPA, PCR

Table 3 above shows calculated regression coefficients with related standardized Beta values, t-value and p-value for each independent variable with respect to the dependent variable. Table 3.1 "Model Summary" shows R-Value, R-squares, F-value and p-values. These values have been calculated with the help of SPSS software by using regression model.

The beta coefficients (standardized) demonstrate the strength of relationship of each independent variables (GNPA, NNPA or PCR) with dependent variable (RNW). T-value is the difference represented in units of standard error of estimate. The high value of T (T-value) provides a stronger proof against the Null hypothesis. In the above table, GNPA, NNPA & PCR have large t-value and the respective p-value is lower than 5% significance level, hence the Null hypothesis that these factors have no significant effect on RNW is rejected. Hence, it can be inferred that the alternative hypotheses have been accepted, which indicates that GNPA, NNPA & PCR have a significant effect on RNW.

While investigating the effect of NPA on financial performance of the bank, it was noticed that when all the predictor variables (GNPA, NNPA & PCR) are taken together in a bivariate regression analysis, the dependent indicator (RNW) was sensitive to NPA. There is a strong significant relationship at 94.7% with an F-value of 35.898 at 5% level of significance between independent variables (GNPA, NNPA and PCR) and dependent variable (RNW), in line with studies by Kiran and Jones (2016) & Chellasamy & Prema (2018).

Stepwise Regression: Further, a stepwise regression model was prepared to show a reduced set of regression indicators in a combined model to identify the strongest factor out of GNPA, NNPA and PCR. Stepwise regression chooses few independent variables in a standard linear regression from a set of variables. Some of the independent variables are excluded as these are not as influential as the selected variable.

Table IV below shows the estimated coefficients alongwith corresponding adjusted R-squares, t-stat, and p-values obtained from stepwise model of regression calculated using SPSS software for the effect of NPA on the profitability (RNW) of SBI.

Table 4 – Stepwise Model of Impact of NPA on Profitability

Coefficients					
	Coefficients (Unstandardized)		Coefficients (Standardized)		
Model	B	Standard Error	Beta	T-value	Sig.
1 (Constant)	21.078	2.270		9.285	.000
GNPA ratio	-2.286	.359	-.914	-6.360	.000

a. Dependent Variable: Return on Net Worth

Table 4.1 - Model Summary

Model	R	R-Square	R-Square (Adjusted)	Std.Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.914a	.835	.814	2.35879	.835	40.455	1	8	.000

a. Predictors: (Constant), GNPA ratio

Table 4.2 - Excluded Variables

Model		Beta In	T	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Min Tolerance
1	NNPA ratio	.148b	.350	.737	.131	.129	7.756	.129
	PCR	.008b	.049	.962	.019	.993	1.007	.993

a. Dependent Variable: RNW

b. Predictors Variable: (Constant), GNPA Ratio

As per the outcomes of the stepwise regression model shown in table IV above, the GNPA ratio has the most significant and negative effect at 5% significant level on return on net worth as implied by high t-value of 6.360. Table IV.A above shows that the adjusted R-square value at 81.4% points out that the GNPA has the high degree of explanatory power in regression for RNW with the F- test value of 40.455 at 5% significance level, which indicates that the model is a good fit for the data. The large F-ratio indicates that Null hypotheses are rejected and the alternate hypothesis that "there is a significant impact of NPA on the profitability of State Bank of India" is accepted. Table IV.B above shows that the stepwise model has excluded NNPA and PCR as these had a lesser correlation with profitability in comparison to GNPA, hence proving that GNPA is the most important factor impacting the profitability of SBI.

Conclusion

This paper has attempted to establish the impact of NPA on the financial performance of SBI, the largest public sector bank of India, using correlation and regression methods of statistical analysis. Pearson's correlation matrix has been used to analyze RNW which has been considered as the dependent variable; and GNPA, NNPA and PCR have been considered as the independent variables for regression analysis. The results of regression and correlation together highlight that the NPA has a significant effect on the profitability of the SBI thereby rejecting the null hypothesis, in line with the study by Chellasamy & Prema (2018). Hence, the alternative hypothesis that NPA has a significant effect on the profitability of the bank is accepted, in line with the study by Chellasamy & Prema (2018). Further, the correlation coefficient is negative, which implies that NPA has a strong and negative impact on profitability. This implies that any reduction of NPA will result in an increase in profits i.e. improves the financial performance of the bank. The stepwise regression analysis indicates that GNPA amongst the NPA is the most significant factor affecting the profitability. Hence if a bank focuses on the reduction of GNPA, the profits will grow and in turn, the return on net worth will also grow. It will result in lesser changes in bank failures too.

Banks can use various preventive measures such as proper due diligence of customers' financial and operational details, digital scrutiny during sanctioning of the loans, following proper maker-checker concept in sanctioning loans, etc. Post facto NPAs can be recovered by using various legal remedies available such as, SARFAESI Act (2002) which empowers the banking sector to sort out the non-performing assets without the interference of courts by using various measures like asset reconstruction, securitization and execution of security; or invoking IBC Code (2016) to revive or liquidate the business/assets; or use of DRTs and Lok Adalats as suggested by Dhawalgi, 2020.

Many qualitative and other factors that affect the financial performance of the bank but due to confidentiality of data and information availability constraints, those are not included in the model which is a limitation of this study. This study is scalable by applying similar techniques for other public banks in India and abroad. It will be interesting to find out the results of the hypothesis of other banks, which can be compared with that of SBI.

This study should help the banking industry and researchers to understand the significance of taking appropriate measures to keep NPA under check, if not eliminated fully. However, eliminating NPA may not be possible due to inherent risk of default in the banking industry but the situation can be improved significantly by formulating strict and appropriate rules on lending policy, credit screening, risk management strategy and by considering macroeconomic condition's while taking lending decision especially while extending high volume credits.

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