RESEARCH ARTICLE

NON-PERFORMING ASSETS OF INDIAN BANKING SECTOR – A PREDICTION

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ABSTRACT

The successful movement of the Indian economy depends upon the smooth functioning of its banking sector. But in recent years, it has witnessed a big issue called Non-Performing Assets (NPAs) and it is becoming an incurable problem for the banking sectors. On the other side, the Indian banking sector has launched a concept called financial inclusion and thus to provide the banking services to the financially excluded people. But, this initiation is putting the additional financial risk on the banking sector in the form of mounting NPAs day by day. This kind of situation has to be tackled in an effective way by the banking sector for their future survival. With this backdrop, the present paper has made an attempt to identify the reasons for rising NPAs and to construct a valid methodology to foresee NPAs in the future. Thus, in this research, Multiple Linear Regression model has been constructed to forecast the amount of NPAs in 2020. This model was constructed based on the existing models used in the prediction and this model would help the Indian banking sector to tackle the NPAs problem in an effective manner.

INTRODUCTION

Banking sector plays an important role in the Indian economy and it is having greater responsibility for the smooth flow of the economic cycle. Nearly, two-thirds of household deposits their money through the banking system, which also contributes more than 89 percent of the business lending in the country. Though India is a banking dominated economy, in the recent years it has been experiencing a continuous decline in its performance due to the issues in the balance sheet and led to the economic crisis (Charudutt Sehgal, 2017). It is very important to take speedy actions to resolve a banking crisis so that banks can start their functions normally again as the principal source of credit. The banking crisis in India is a regular incident due to improper asset quality management (Laeven and Valencia (2012). Indian banking sector consists of commercial and cooperative banks. As of March 31, 2012, commercial banks having 95 percent of the market share out of the total market size (Sarkar and Sarkar, 2016). As per the second schedule of the Reserve Bank of India (RBI) Act, 1934 commercial and cooperative banks are called as scheduled commercial banks (Dhanabalan, 2011; Ahamed, 2017). Further, the scheduled commercial banks also classified into public sector banks, private sector banks, and foreign banks.

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There are 27 banks comes under Public Sector Banks (PSBs) out of which 21 banks belongs to Nationalised banks (NBs) and six with State Bank of India (SBI) and its group, private sector banks is concerned 14 banks clubbed as Old Private Sector Banks (OPSBs) and 11 banks grouped as New private sector banks (NPSBs) thus 25 banks come under private sector banks, 45 Foreign Banks (FBs), 56 Regional Rural Banks (RRBs), 1,589 Urban Co-operative Banks (UCBs) and 93,550 Rural Cooperative Banks (RCBs) in addition to cooperative credit institutions (RBI Guidelines 2017). Maintaining asset quality and profitability are significant factors for the growth and survival of the banks. However, the asset quality and profitability of the banks have affected by an issue called Non-Performing Assets (NPAs) (Charan Singh and Jagvinder Singh Brar 2016). NPAs is like a "double-edged Knife" by which it does not only affect the net interest margin but also depress the current profit generated by other performing assets due to unavoidable provisions on impair loans (Rajamohan and Dhanabalan, 2013; Selvarajan and Vadivalagan, 2012). The issue of NPAs was not considered seriously in India until it was stressed by the Narasimham and Verma committee. The committee also mandated the banks to reduce NPAs as much as possible through trim down the credit risks and effective allocation of existing resources (Rao KS, 2016).

NPAs: An Overview: As per RBI, an asset becomes non-performing when it is not able to generate income for the bank.

In those days an asset was considered as non-performing one based on the concept called Past Due concept. According to the concept, NPAs has been defined as a credit in respect of which either interest or payment of principal has remained 'past due' for a specific period of time. An amount is considered as past due when it remains outstanding for 30 days beyond the due date. The 'past due' concept has been replaced by 'period concept' and the same is considered from 31, 2001 to notify the NPAs (Rajamohan and Dhanabalan, 2013a; Aditi Pathak and Niraj Lodha, 2017). With a view to go along with international practices and to ensure greater transparency about NPAs a new definition has framed and it accepted worldwide. According to the definition, a loan or an advance where interest or installment of principal remains overdue of more than 90 days in respect of a term loan. The account remains out of order for more than 90 days, in respect of an overdraft and cash credit. The bill remains overdue for a period of more than 90 days in the case of bills purchased and discounted. In the case of direct agricultural advances, the loans would be treated as NPA considering the duration of the crop season (Rajamohan and Dhanabalan, 2013b). In respect of agricultural loans more than two crores, identification of NPAs would be done on the same basis as non-agricultural advances. Any amount to be received remains overdue for a period of more than 90 days in respect of other accounts (FICCI, 2016).

Types of NPAs: NPAs are classified into the three types based on the time period such as substandard assets, doubtful assets, and lost assets. Substandard assets remain as NPAs for less than or equal to 12 months, an asset which remained as NPAs for 12 months is called as doubtful assets and assets where loss has been identified by the bank or the RBI is known as loss assets. Though it is in loss assets there may be some cost remaining in it, hence it cannot be completely written off (Mayur Rao, 2015).

Reasons for NPAs in the Indian Banking Sector: The reasons for NPAs can be the accumulation of various factors like bribery, corruption etc. The main reason for the problem is the lack of efforts by the side of the service provider during the approval process. Absents of attention on the process of carrying out a due meticulousness process or conducting it in a messy manner leads to growing cases of NPAs. An excuse for companies is blaming the economic scenario for defaulting; on the other hand, forensic audits draw a different conclusion. In many of the cases, borrowers have transferred funds to other purposes than the actual or they have willfully defaulted. The honesty of the promoter also comes into a question mark in well-developed profile cases like that of Kingfisher (Rajamohan and Dhanabalan, 2014).

Acquiring tangible security is also a headache during credit augmentation as the loan amount prevailing over the sales value of the attached security by a considerable margin, thereby diluting the provision of SARFAESI Act (Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act). Poor monitoring process after the disbursement is also the reason as in many of the cases there is no forensic audit after initial sanction of loan. There is a lack of due conscientiousness for loan sanction of the sector, where the interest of promoter lies and after sanctioned, examining is poor resulting in NPAs (Chaitanya, 2004). Economic failure in domestic as well as global economy, constitutional and other holdups in the endorsement of projects under execution, hostile lending by banks in periods of economic boom and revival, carelessness in credit risk evaluation, inappropriate loan monitoring methods by banks, poor appraising skills in specialized projects, willful defaults, fraudulent document submission against loan and corruption are some of the reasons boosted the NPAs in Indian Commercial banks (Raguram Rajan, 2016). Rising NPAs in banks is the outcome of some of the non-economic reasons such as unnecessary delays in execution or completion of projects, loss or waste of raw materials; high real interest rates, improper planning and so on (Nilesh Shah, 2017). Non-performing administration and officials are also the attributes of NPAs in banks (Dhanabalan and Rajamohan, 2014a; Chakrabarty, 2014). Indian banks have been the categorization of a huge volume of NPAs, which gives them a scope to keep lesser provisions. A leading asset quality review by RBI in 2015 exposed the true picture of increasing NPAs in banks as the incorporation of restructured standard advances, which gave an additional holistic vision of total stressed assets in banks (Madan Lal Bhasin, 2017). The practice of streamlining standard advances generates a moral hazard problem and gives scope to borrowers to shape that projects have failed due to inappropriate events. The official NPAs figures because of the undermining of repayment of the loan in banks (Samantaraya, 2016). Total NPAs in Indian banks have gone up from 10 percent in March 2014 to 11.5 percent in March 2016. The macro stress test also suggests that under the baseline scenario, the gross NPAs may rise to 8.5 percent by March 2017 (The Hindu, 2016).

Importance of Predicting NPAs: In the recent years, banks urged to find a solution to reduce and maintain NPAs with a view to having a stable financial system. Since NPAs is a major cause of the economic stagnation and problem to the economic growth, it should be predicted properly often. The management of NPAs is an essential one to improve asset quality and profitability of the banks. In this process, banks need to restructure their existing business model and become innovative in their efforts in order to remain in business and to perform well. However, the administration needs to have an intensive observation of the relationship between NPAs management practices and financial performance of the banks. So those, banks can ensure the position of NPAs at regular interval and control it as lower as possible (Titus Lucy Wanjira, 2010). The threat of NPAs mainly arises as the external economic environment becomes worse off such as economic depressions. Controlling non-performing loans is very important for both the performance of an individual bank and the economy's financial environment (McNulty, Akhigbe, and Verbrugge, 2001; Dhanabalan, 2011). The problem of NPAs is a serious issue and it distresses the financial health and liquidity position of banks. The goodness of the assets of a bank is measured in terms of its NPA ratio. Unfortunately, the banking sector in India is under financial pressure due to mounting up of NPAs, and they are forced to predict the future rise of the same. So that corrective actions can be taken at habitually (Gourav Vallabh, Digvijay Singh, and et al. 2016).

Banks need to assess before and after approval of the credit and it is an important one to minimize NPAs. Conditional evaluation of financial statements will help to discover the unhealthy growth in accounts and working position of the company, proper estimation of the viability of the project before sanctioning the financial assistance to a borrowing unit are the crucial aspects in plummeting NPAs (Rajamohan and Dhanabalan, 2014b; Beck and Jakubik 2013).

With this backdrop, we propose a methodology for forecasting NPAs and thereby we have predicted NPAs of the Indian banking sector and estimated the crisis has to be faced by the banking sector in the upcoming years. We intend to predict the amount and percentage of NPAs of the banks will have to face in 2020. The forecasted value can be used by RBI to estimate whether the system will survive or collapse.

RESEARCH METHODOLOGY

The main purpose of this paper is to predict the NPAs of the scheduled commercial banks and public sector banks of the Indian banking sector. It can thereby be used to predict NPAs of scheduled commercial banks and public sector banks and gauge the crisis is facing. There are many forecasting methods which can be used to predict the variable of interest. They are broadly divided into two categories such as Regression models and Time-series based methods. Under the regression model, there are two methods have been followed namely Simple Linear Regression (SLR) and Multiple Linear Regression (MLR). There are five methods such as Moving Average (MA), Simple Exponential Smoothing (SES), Holt, and Holt-winter method (HW) comes under time series. As far as the regression models are concerned they have used for forecasting future events. Depends on the tendency of independent variables, they predict the tendency for the dependent variable. Since the study was aimed to predict the NPAs of scheduled commercial banks and public sector banks of Indian banking sector in 2020 in association with external economic factors such as gross advances and loans (GA&L) gross domestic product (GDP), repo rate (RR) and inflation rate (IR) regression models are considered as the best suit in this particular circumstances. SLR could not be used because it gives the value of the dependent variable (Gross NPA's) in terms of only one independent variable. According to the study, NPA is an attribute of various factors so the SLR method was unable to provide desirable results. Hence, the MLR method has been chosen for the present study.

Factors Used in the Analysis

Gross advances and Loans (GA&L): Loans and advances are playing a vital role in the prediction of NPAs because loans and advance have sanctioned along with some risks. As the size of loans and advances increases, the risk proportion also increases and finally leads to the problem of NPAs. Hence, loans and advances considered as one of the factors.

Gross Domestic Product (GDP): GDP is a growth indicator of a county. GDP is the overall market value of all finished goods and services produced in a country in a given period and it is equal to the overall consumption, savings and public expenditure by the government. When the GDP increase, loans, and advances also increase and therefore it is directly paving a way for NPAs. Furthermore, when the economy is in total disorder, companies couldn't repay the debts which will thereby automatically lead to the issue of mounting NPA's.

Repo Rate (RR): Repo rate is a rate at which the central bank of a country lending money to commercial banks during a shortage of funds or underperformance of banks. It is an indicator of the current interest rate of the country. Both interest rate and inflation have a combined effect on the economy and capacity of the borrowers to repay the debts.

Therefore, RR is also considered one more important factor for NPAs.

Inflation Rate (IR): The inflation rate has been fixed based on the consumer price index (CPI) and it is the prime indicator of inflation in most of the economies. IR in India is based on the CPI. When the inflation increase it becomes inexpensive for borrowers to have a loan, because of inflation buying ability of the consumer's fall resulting in the drop in profits for the companies. Both inflation and CPI have led to a rise in NPAs (Gourav Vallabh, 2016).

Research Process: For the analysis purpose, 14 years annual data of four factors namely GA&L, GDP, RR, and IR have taken into the account from 2005-2016 for Scheduled commercial banks (SCBs) and Public sector banks (PSBs) of India. MLR models were developed using a combination of listed factors for forecasting the NPAs in the SCBs and PSBs in the year 2020.

RESULTS AND DISCUSSION

In Multiple Linear Regression, we have used a combination of independent variables GA&L, GDP, RR and IR for finding out their relationship with the NPAs. It can be used to predict the NPAs of SCBs and PSBs on the basis of the independent variables. The MLR model is:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \cdots + \beta_k X_{ki} + \varepsilon_i \quad [1]$$

Where,

Y_i = dependent variable = Gross NPAs,
X_{ki} = independent variables = GA&L, IR, GDP and RR,
β_0 = Y intercept,
β_k = slope of Y on bar with X_{ki}, holding other variables constant,
ε_i = chance of error in Y for observation 'i'.

With all these factors combination the MLR models were developed and the results are presented below:

Results of Scheduled Commercial Banks

As mentioned earlier, to reap the best results of the MLR analysis, the stepwise regression model was used to identify the significant factors out of the given variables. Model summary of table one shows that the R square of MLR is .858 and it is considered a good indicator of regression relationship of the variables. The MAPE for the linear stepwise model is 5.72 and this value supports linear stepwise regression to take care of the multi-co-linearity issue. Thus, it is proved that the stepwise regression model is the best one to predict the NPAs of the given banks. Out of four independent variables, there are two variables namely GA&L and IR having a significant relationship over the dependent variable. Each of these 'β' values has an associated standard error indicating to what extent these values would vary across different samples, and these standard errors are used to determine whether or not the 'β' value differs significantly from zero. Therefore, if the 't' test associated with a 'β' value is a significant contribution to the model. For this model, 't' value of GA&L is 6.833, p < 0.001, and 't' value of IR is -2.431, p < 0.038 are the significant predictors of NPAs.

Table 1. Data for all Scheduled Commercial Banks

Year	GA&L Rs. in Crore	IR	GDP	RR	GNPA Rs. in Crore
2017	81161.57	5.21	2652	6.2	7902.
2016	81673.45	4.97	2251	6.5	6119.5
2015	75606.66	5.88	2074	7.7	3233.4
2014	68757.48	6.37	2049	8	2633.7
2013	59718.2	10.92	1862	7.7	1935.1
2012	46488.08	9.3	1832	8.1	1423.3
2011	40120.79	8.87	1836	8.5	979.11
2010	35449.65	12.11	1365	6.25	846.98
2009	30382.54	10.83	1224	4.7	683.28
2008	25078.85	8.32	1239	6.5	563.09
2007	20125.11	6.39	949	7.2	504.86
2006	15513.78	5.79	834	7.2	510.97
2005	11526.82	4.25	722	6.2	593.73

Source: GA&L and GNP and RR from Annual Reports of RBI from 2005 to 2016, IR from http://www.inflation.eu, GDP from http://www.statisticstimes.com,

Table 2. Data for Public Sector Banks

Year	GA&L Rs. in Crore	IR	GDP	RR	GNPA Rs. in Crore
2017	81161.57	5.21	2652	6.2	6847.33
2016	58183.48	4.97	2251	6.5	5399.56
2015	56167.18	5.88	2074	7.7	2784.68
2014	52159.2	6.37	2049	8	2272.64
2013	45601.69	10.92	1862	7.7	1644.61
2012	35503.89	9.3	1832	8.1	1124.88
2011	30798.04	8.87	1836	8.5	710.42
2010	27334.58	12.11	1365	6.25	293.75
2009	22834.73	10.83	1224	4.7	211.55
2008	18190.74	8.32	1239	6.5	178.36
2007	14644.93	6.39	949	7.2	151.45
2006	11347.24	5.79	834	7.2	145.66
2005	8778.25	4.25	722	6.2	169.04

Source: GA&L and GNP and RR from Annual Reports of RBI from 2005 to 2016, IR from http://www.inflation.eu, GDP from http://www.statisticstimes.com

Table 3. MLR Model Summary for SCBs

Model Summary					
Independent variables	R	R Square	Adjusted R square	MAPE	MAD
GA &L, IR,	.926	.858	.827	5.72	39.17

Table 4. MLR Coefficients for SCBs

Coefficients								
	Unstandardized Coefficients		Standardized Coefficients			Correlations		
Model	B	Std.Error	Beta (β)	t	Sig.	Zero- order	Partial	Part
(constant)	673.419	777.644		.866	.409			
GA&L	0.60	.009	.859	6.833	.000	.875	.916	.858
IR	-196.837	80.983	-.306	-2.431	.038	-.350	-.630	-.350
Dependent Variable: GNPAs								

Table 5. MLR Model Summary for PSBs

Model Summary					
Independent variables	R	R Square	Adjusted R square	MAPE	MAD
GA &L, IR,	.910	.828	.790	6.84	44.20

Table 6. MLR Coefficient for PSBs

Coefficients								
	Unstandardized Coefficients		Standardized Coefficients			Correlations		
Model	B	Std.Error	Beta (β)	t	Sig.	Zero- order	Partial	Part
(constant)	340.357	463.823		.734	.482			
GA&L	.043	.007	.836	6.041	.000	.842	.896	.836
IR	-121.392	48.762	-.344	-2.489	.034	-.360	-.639	-.344
Dependent Variable: GNPAs								

From the magnitude of the 't' statistics, we can see that GA&L had more impact on NPAs than IR. The standardized 'β' values are all measured in standard deviation units and so are directly comparable: therefore they provide a better insight into the 'importance' of the predictor in the model. The standardized 'β' value for GA& L is .859, and for IR is -.306. These values revealed that GA&L has more impact on the model. Thus based on the stepwise regression model the following forecasting equation has arrived.

Equation: $Y1 = 673.419 + 0.060*GA\&L - 196.837*IR$

By using the above-mentioned equation we can calculate the NPAs of SCBs in 2020. In 2020 assumptions regarding the independent variables are GA&L expected to be Rs.1,69,358.20 crores based on the advances and loans growth rate of 20 percent year on year as expanding the banking services. As far as the IR is concerned it will be 6 percent in 2020 as assuming a stable inflation rate. Thus, it is forecasted that the NPAs in 2020 would be Rs.8366.29 crore which is 4.94 percent of average loans and advances of all scheduled commercial banks.

Results of Public Sector Banks: The R square value of MLR .828 reveals the fact that selected variables having 82.8 percent of the variability in NPAs of PSBs. MAPE of 6.84 is a preferable level and it confirms the use of linear stepwise regression as a best-fit model for predicting NPAs of the PSBs. It was observed from the table that the 't' values of GA&L 6.041, $p < 0.001$ and IR -2.489, $p < 0.034$ are the considerable predictors of NPAs. Even though, it was understood from the 't' statistics that GA&L having more impact on NPAs than the IR. The standardized 'β' values are concerned GA& L is having .859, and for IR is -.344. These values revealed that GA&L has more impact on the model. Thus based on the stepwise regression model an MLR equation has arrived as follows.

Equation: $Y1 = 340.357 + 0.043*GA\&L - 121.392*IR$

Based on the equation, NPAs of PSBs in 2020 has been calculated. The assumptions about the independent variables are: IR in 2020 would be 6 percent and it is assumed as the stable inflation rate. As far as GA&L is concerned it will be about Rs.144779.14 crore and it is assumed as the growth of 20 percent year on year as banking services expanding. Thus, it is forecasted that the NPAs of PSBs in 2020 would be Rs.7152.08 crore which is 4.94 percent of average loans and advances of all PSBs.

Preventing Measures

Amendment in banking law to give RBI more powers: The existing directive principles of the banking may be modified to ensure the RBI with more power to take charge of defaulters. Thus the RBI may form a supervisory committee in order to identify and control the immense defaulters. Further, it should rigid the policies related to joint lenders' forum (JLF) and oversight committee (OC) to manage NPAs. Because, the prevailing banking regulations permit the government to direct the RBI to inspect the lending banks and not for forming an oversight committee. Hence the existing directive principles of the banking need to be modified.

Stringent NPAs recovery rules: Since the existing NPAs recovery act called "The Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act or Sarfaesi Act of 2002" is taking much time to recuperate the assets of the defaulters, rigid rules and regulations should be framed with a view to recovering defaulters' assets immediately. On the other side, financial experts advise that the problem of NPAs has to be tackled before the firm gets into defaulting.

Banks may need to take a "haircut": Many of the PSBs have witnessed that a sudden fall in their profits in the very recent times and huge accounts have been noted as loss accounts due to the rise of NPAs. In relation to this issue, the government advised the banks to go ahead with "haircut" or write-offs for NPAs (Raj Kumar Ray, 2017).

Strengthen the Monitoring Process Before and After Sanction of Loans: Pre and post-loan sanction process should be amplified. Both internal and external banking process should be monitor regularly. In order to avoid the mounting of NPAs, the data analytics services should be made available to the PSBs, through which the entire history about the firm such as cash flow capability, past banking records, and future growth projections can be attained. Thus, the overall capacity of the firm can be ascertained and based on that new loans may sanction to the firms.

Privatization of weak PSBs: To control the rise of NPAs, the Indian government may go for the privatization of weak public sector banks. By this process, the unnecessary government control over the PSBs will be freed and it avoids the political turbulence. Though this move creates some social and political inconvenience, privatization is the only way to recover and safeguard the PSBs from the financial evil called NPAs (Rajamohan and Dhanabalan, 2012).

Toughen the Governance Mechanism: Poor governance of the PSBs is also the major reason for the mounting of NPAs. The former governor of RBI Y.V. Reddy has stressed on this issue and recommended some of the reforms for the effective governance that division of chief executive officer and chairman position, providing independence to the board members and highest degree of diversity in the board members selection (Park and Dhanabalan, 2019). By supporting this recommendation the Banks Board Bureau was enacted in 2016 for supervising governance reforms and it was very effective in the initial stage but it has diluted its effectiveness in the recent days. Hence in order to avoid the NPAs in PSBs, a tough governance mechanism is need of the hour (Dhanabalan, Shanthi, John peter, 2018).

Ignore the concept of Restructuring of Assets: The concept of restructuring bad assets plays a major role in the formation of NPAs. By this concept, banks are trying to hide the NPAs. Since the restructuring assets come under bad loan concept the RBI should stiffen the provisions of restructuring assets and banks should functioning properly in categorizing the NPAs and thus government should make sure that PSBs capital needs (Nidugala and Abhay Pant, 2017).

Conclusion

It was observed from the study that, the linear stepwise regression model was used to predict NPAs for SCBs and

PSBs. The model predicted that the issue of NPAs would magnify a major problem with severe reverberate. Thus, NPAs is being a headache to the banking sector and it needs to be curb as fast as possible. As far as the SCBs is concerned, it was claimed that NPAs would be Rs.8366.29 crore in 2020 and it is 4.94 percent of the average loans and advances of all SCBs. PSBs portrays that, its NPAs would increase to Rs.7152.08 crore in 2020 and it would be 4.94 of the average loans and advances of PSBs. It is also observed that, though the average loans and advances of SCBs and PSBs are same at 4.94 percent, SCBs would have more NPAs than PSBs in 2020. With a view to helping the survival of the banks, NPAs should be controlled as much as possible. We also covered a variety of macroeconomic factors for NPAs and their feasible solutions will also be considered to prevent a loan from converting it into NPAs.

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