

Exploratory Factor Analysis of NPAs of Indian Banking Sector: A Step towards Sustainability & Profitability



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Abstract

Besides being custodians of people's wealth, banks are also reservoirs of financial resources giving a boost to country's economic development. Banks can play a pivot role in the attainment of United Nations SDGs by contributing in modern commerce through industrial innovations and business expansions, which would be possible through finance provided by banks. Banking is one of the fundamental industries supplying most essential element i.e. finance for the development of trade, commerce and industry. Similar to other businesses, success of a bank can be judged by making an analytical assessment of its profitability and quality of assets owned by the bank. Apart from profit motive, banks also fulfil their social responsibility by providing priority sector lending, creating mass branch networks for financial inclusion and generating employment for masses. However, while meeting these two objectives, sometimes, bank's own survival and growth is put at stake in the form of Nonperforming assets which like a deadly virus pose major threat towards banking sector marking a dent on its liquidity and profitability. Thus rising NPAs are acting as major roadblock in the attainment of desired goals. In this paper an attempt has been made to analyse this problem through an Exploratory Factor Analysis of major causes responsible for ever mounting NPAs. Besides, key suggestions to minimize NPAs are also identified on the basis of primary data analysis. Section I of the paper explains basics of NPA and its impact on banks' sustainability and profitability. Section II gives due recognition to the articles referred to for the purpose of this study in the form of Literature review. Research methodology is discussed in Section III. Primary data analysis is performed in Section IV wherein Exploratory Factor Analysis is executed to achieve the objectives of the study. This study identifies five main factors for increasing NPAs in Indian Banking sector such as Unworthy borrower, Human Resource Challenge, Legal Inadequacies etc. Section V puts forth three factors for suggestions to decrease NPAs likewise Proactive Measures, Efficient Recovery Systems, Borrower Relationship Management etc. so that efforts can be made to minimize NPAs which will enable the banking sector to contribute to its fullest for the achievement of national as well as global goals in the form of SDGs.

Keywords: NPAs, Indian Banking Industry, Exploratory Factor Analysis, Sustainability & Profitability of Banks.

Introduction

Sustainable finance presents both challenges as well as opportunities being directly associated with sturdiness and competitiveness of institutions involved in the financing activities for stable growth development. Although sole objective of economic initiatives have been growth and development but results visible in past few years present a contrast picture in terms of decrease in the quality of environment, increasing social inequality, creative destruction, health challenges etc. along with repercussions thereof. In order to meet these challenges on global front United Nations have identified 17 Sustainable Development Goals such as End poverty in all its forms, Zero Hunger, Health, Education, Gender equality and women's empowerment, Water and Sanitation, Energy, Economic Growth, Infrastructure, industrialization, Inequality, Cities, Sustainable consumption and production, Climate Change, Oceans, Biodiversity, forests, desertification, Peace, justice and strong institutions,

Partnerships : The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. The Goals interconnect and in order to leave no one behind, it is important that we achieve each Goal and target by 2030.

In the achievement of all such SDGs, banking services have major role to play. However banks are facing a major threat to their own survival in form of Non Performing Assets posing question mark on the banks' sustainability and profitability.

Commercial Banks generally show different categories of assets in their books of accounts such as cash & bank balances, balances with other banks, investment, loans and advances, fixed assets and many more. Generation of expected return without additional risk creates a demarcation line between Performing and Nonperforming asset. An asset become non performing only when it fails to perform in terms of generating expected income, "A 'non-performing asset' (NPA) was defined as 'an asset on which interest and/or principal amount have not been received or remained outstanding for one quarter or more from the day such income/instalments has fallen due" (M.Y. Khan, 2007). In case a borrower has not paid interest or principal for more than 90 days, then bank will consider all of the advances or credit facilities granted to that borrower as nonperforming irrespective of the fact that other assets of that borrower are still performing in terms of payment of amounts due. This norm of 90 days overdue' for identification of NPAs has been adopted since 2014, in terms of prevalent international best practices and to ensure greater transparency. Considering the level of support for assets in terms of collateral security for realization, Assets can be classified into standard, substandard, doubtful and loss assets. In the present paper efforts are made to identify the main causes of ever increasing Nonperforming assets in the banks. Efforts are also made in the present study to suggest the ways for identifying the main causes of increasing Nonperforming assets and what could be the areas where deserved attention is required to be paid to tackle the problem of NPAs in the growing credit based economy.

Review of Literature

Before presenting own analysis it is essential to go through the research already done on this subject matter. Some of the papers and works studied are presented in the following literature review:

(A Study on Credit Risk and NPA Management Practices of Indian Bank , 2013) Rajeswari

In this study the author attempts to study the credit risk possibilities of Indian bank, to evaluate the trends in the loans and deposits of Indian Bank and to analyze the NPA pattern of the banks. This paper identifies deteriorating credit quality to be most persistent cause of financial crisis and poor performance. Credit risk emanates not only from loans but also from other lending instruments. In this paper, an attempt has been made to comprehend the

various concepts of credit risk management policies and their importance in the context of priority sector. Main suggestions given by the author is that financial institutions have to consider sound credit management a prerequisite for bringing in stability and continuing profitability.

(Impending NPA crisis in Indian Banks & Remedies, 2014)

This article names few prominent businesses who have been wilful defaulters in recent years such as Zoom Developers, Winsome Diamond, Sterling Biotech, Kingfisher Airlines, and Bhushan Steel etc. which have highlighted the loopholes in the whole process of risk management in the whole Indian banking sector. In this article, the authors have made efforts to discover that whether NPAs are a part of a systemic problem or it is something which is created and nurtured by the banks themselves. Besides displaying the size of the NPA in 2013 the authors have also discussed the steps taken by RBI & Government to handle the difficult situations.

(Ahmed, Akhtar, & Usman, 2011)

In this study authors have explored various such factors which can impact the effect of risk management practices of Islamic banks in Pakistan. For this purpose, credit, operational and liquidity risks were selected as dependent variables while size, leverage, NPLs ratio, capital adequacy and asset management were recognised as explanatory variable for the study period of four years from 2006 to 2009. A significant and positive relationship was found between the size of the bank and financial risks such as credit and liquidity risk. On the other hand, there was negative and that too insignificant relation between size of the bank and operational risk.

(Lalitha, 2013)

In this thesis the author has attempted to carry out a comparative study of the magnitude and dimensions of NPA's in the Public and private sector banks along with examining the causes for incidence and trends of NPA's therein. Efforts are also been made to explore the recovery measures and strategies followed for reducing the burden of NPAs. Besides, suitable suggestions are also made effectively for handling the challenges posed by the NPAs. These causes and suggestions have further made a base for the primary data collection questionnaire in the present study.

Research Methodology

Objectives of the Study

1. To analyze the causes for occurrence of NPAs in the public and private sector banks.
2. To discuss suitable suggestions for both public as well as private sector banks to efficiently deal with the challenge emanating from increasing NPAs.

Scope of the Study

Scope of the present study comprises Scheduled Commercial Banks, since they are included in the Second Schedule of the RBI Act, 1934. Banks earn their returns through the interest they charge on their loans and advances. However, risk arises when banks don't get their interest and loan amount back within the given time frame, which entails risk which

becomes NPAs. On the basis of literature review it was found out that approximately 2000 persons are working as bank managers of various branches and as risk managers in Risk management departments of different banks within the vicinity of Delhi-NCR. On this basis approx. 800 questionnaires were sent to different respondents through personal contact and mail however 372 responses received were fit to study further. So sample size of 372 (on 95% Confidence interval) is calculated and responses to questionnaires are obtained accordingly for the purpose of primary data collection. Formal and informal interviews were conducted with managers and officials on random cum convenience sample basis from Delhi NCR bankers. Data thus obtained has been analysed in tune with the set objectives of the study bringing out comparison between the public and private sector banks on different parameters involved in the study. The observations were tabulated to facilitate easy understanding and were supplemented with appropriate graphical presentations. The primary data was collected with the help of an instrument of structured questionnaire.

Instrument of Data Collection: Questionnaire

This study covered Indian scheduled commercial banks comprising 26 public sector banks, and 20 private sector banks. Primary data is obtained by questionnaire method in which survey is conducted to obtain the viewpoints of risk managers about the causes of increasing Non-performing assets in the banks as well as suggestions to minimise such NPAs. These issues are related to the functionality, continued existence and sustainability of banks.

Profile of the Respondents

Profile of the respondents of the research questionnaire is shown in Table 1. This table gives the composition of respondents. In total there are 372 respondents belonging to different Bank Types (likewise, Public and Private Sector Banks), working in different Cadres of Banks such as (Senior, Middle and Junior management) and having different ranges of experience like less than five years, 5-10 years and more than 10 years. The data collected through this questionnaire is analysed, interpreted and discussed in the following sections.

Table 1
Profile of Respondents
(N=372)

S. No.	Profile	Number	Percentage
1	Bank Type		
	1. Public Sector Banks	273	73.4%
	2. Private Sector Banks	99	26.6%
	Total	372	100
2	Cadre of Bankers		
	1. Senior Management	69	18.5%
	2. Middle Management	192	51.6%
	3. Junior Management	111	29.8%
	Total	372	100
3	Experience of Bankers		
	1. Less than 5 years	90	24%
	2. 5-10 years	99	27%
	3. More than 10 years	183	50%
	Total	372	100

Source: Field survey

Bank Type Wise Profile of Respondents

As shown in Table 1 above, sample of 372 bank employees was selected randomly for this study from a universe of bank employees of private and public sector banks situated at Delhi and NCR (National Capital Region) majorly comprising Faridabad, Ghaziabad, Guru gram and Meerut.

Selection of sample has been done on the basis of data given on RBI website under the heading of Basic Statistical returns (Reserve Bank of India, 2015) "Report on Trends and Progress of Banking in India 2014-15". This statistical table indicates that proportion of Deposits of Public Sector Banks comprising State Bank of India and its Associates along with nationalised banks amount is 72.9% (21.9%+51%). Similarly Advances outstanding for Public Sector Banks is 71.6% (21.5% for State Bank of India & its Associates and 50.1% for Nationalised Banks). On the similar grounds Respondents from Public and Private sector banks have been taken as approx 73.4% (273) respondents belong to Public

Sector banks and 26.6% (99) respondents are working in Private sector banks.

Hypothesis of the Study

For the purpose of data analysis following hypotheses were framed and tested.

Hypothesis 1

H₀: There is no significant difference between Dimensions for Causes of increasing NPA Scale between the respondents of Public and Private Banks

H₁: There is significant difference between Dimensions for Causes of increasing NPA Scale between the respondents of Public and Private Banks

Hypothesis 2

H₀: There is no significant difference between Dimensions for Suggestions to minimize NPA Scale between the respondents of Public and Private Banks

H₁: There is significant difference between Dimensions for Suggestions to minimize NPA

Scale between the respondents of Public and Private Banks

Tools of Data Analysis

In order to analyse primary data, Exploratory Factor Analysis technique has been carried out. The data obtained has been analyzed using suitable statistical measures / techniques. Primary data is collected from 372 respondents through a structured questionnaire having 12 statements for Causes of increasing NPAs and 11 statements for suggestions of decreasing NPAs. Such statements are on 5-point Likert scale ranging from Strongly disagree to Strongly agree with the statement given. In order to realize the objective of identifying main causes and suggestions for NPAs, Dimension reduction technique Exploratory Factor Analysis (EFA) is applied. Prior to running EFA, its requirements were checked through *Bartlett's Test of Sphericity and Kaiser-Meyer-Olkin Measure (KMO) of Sampling Adequacy* which showed that the data is sufficient to carry out Factor Analysis. As a result of EFA 5 main factors for causes of increasing NPAs and 3 main factors for suggestions of decreasing NPAs were identified and then on these factors independent samples' t-test was applied to determine the whether any significant difference in

averages exists between public sector and private sector banks.

Section IV: Data Analysis

After reviewing various articles given in different national and international journals, RBI guidelines, observations of Basel Committee for Banking Supervision etc., an attempt has been made to identify 12 major causes for increasing NPA in India. These causes were presented in the form of a structured questionnaire to 372 respondents so as to elicit their level of agreement with these causes on a 5 point Likert Scale having values such as: 1=Strongly Disagree, 2=Disagree, 3= Neutral, 4=Agree, and 5=Strongly Agree.

Factor Analysis of Causes of Increasing NPAs in Banks

The questionnaire administered in the present study contains 12 statements for causes of NPAs. The overall Cronbach's alpha (α), for the 12 causes of increasing Non-performing assets is 0.710 indicating an acceptable degree of consistency among the responses against each item. Besides, *Bartlett's Test of Sphericity* (significant level of $p < .05$) is executed to confirm that the data has patterned relationships which came out .659 showing sufficiency of data.

**Table 2
Factors and Factor Loadings for Causes of NPA Scale
(N=372)**

Factor / Dimensions	Items	Factor Loadings
Unworthy Borrower (QFACT 1)	Manipulated lending process	.702
	Diversion of Funds	.779
	Poor Credit Appraisal	.642
	Non compliance of Risk Management Policies	.606
	Ineffective use of Risk Analysis Tools	.696
Human Resource Challenge (QFACT2)	Inadequate staff for Supervision and Follow-up of loans	.820
	Inadequate training regarding Credit Risk Management	.834
Aggravating NPAs (QFACT3)	Natural Calamities	.759
	One time settlements by banks or through Lok Adalats	.806
Legal Inadequacies (QFACT4)	Willful Default by the borrowers	.796
	Corruption	.819
Rate of Interest (QFACT5)	High Rate of Interest	.890

Testing of Hypothesis for Causes of increasing NPAs

Five factors have been extracted as explained in Table 2 above. These five factors are the dimensions or variables which will be analysed in the subsequent sections in order to meet the requirement of Objective No. 1 and also for testing of hypothesis.

For Testing of Hypothesis purpose, mean scores have been computed. To examine whether Causes of increasing NPAs differ significantly between Public Sector Banks and Private Sector Banks, Null hypothesis is framed and an independent samples t test has been executed and the results are interpreted.

H₀

There is no significant difference between Dimensions for Causes of increasing NPA Scale between the respondents of Public and Private Banks.

The result (Table 3) below shows that there are no significant differences among the factors like Unworthy Borrower (t value = .739), Variables aggravating NPAs (t value = 1.128) and Legal Inadequacies (t value = .903). However, there is significant difference in Human Resource Challenge (t value = 3.630) and Rate of interest (t value = 3.483) at significant level .01. Thus, for QFACT 1, QFACT 3 and QFACT 4 factors Null hypothesis is true indicating no significant difference between Public and Private Sector banks with respect to these causes of increasing NPAs. However, opinions of Public and Private Sector banks' employees significantly differ on human resource challenge (QFACT 2) and rate of interest (QFACT 5) as causes of increasing NPAs.

Table 3
Comparison of Dimensions for Causes of increasing NPA Scale between the respondents of Public and Private Banks
(N = 372)

Dimensions	Public (N=273)		Private (N=99)		t-value
	Mean	SD	Mean	SD	
Unworthy Borrower (QFACT 1)	3.3319	.68334	3.3939	.79870	.739 ^{NS}
Human Resource Challenge (QFACT2)	3.5220	.81994	3.1364	1.10845	3.630 ^{**}
Aggravating NPAs (QFACT3)	3.2033	.84989	3.3182	.91600	1.128 ^{NS}
Legal Inadequacies (QFACT4)	3.1099	.98463	3.2121	.90939	.903 ^{NS}
Rate of Interest (QFACT5)	2.2308	.86700	2.6061	1.04801	3.483 ^{**}

** Significant at .01 Level * Significant at .05 Level

NS – Not Significant

Analysis of Suggestions to Minimize NPAs

Backbone of Indian economy is its banking sector which is going through a transitional phase because of continuous reforms and amendments in regulation on domestic as well as international front. Major portion of Indian banking industry is still captured by public sector banks in terms of assets, deposits, employees, branches etc. through its wide network and support of the government. However, public sector banks are laden with the unwarranted Non Performing Assets (NPA), which is hampering their growth and is proving to be detrimental to the development of Indian economy. Private sector banks are equally facing this problem of increasing NPA, causes of which have been analysed in the previous section. That's why it is the need of the hour to develop such a robust risk management system which reduces the level of NPA and brings an effective value addition to the bankers and economy. Keeping this in mind, an attempt has been made in this study to identify 11 major suggestions to minimize NPA in Indian banks. These suggestions were presented in the form of a structured questionnaire to 372 respondents so as to elicit their level of agreement with these suggestions on a 5 point Likert Scale having values such as: 1=Strongly Disagree, 2=Disagree, 3= Neutral, 4=Agree, and 5=Strongly Agree.

Factor Analysis of Suggestions to Minimize NPAs in Banks

The questionnaire administered in the present study contains 11 statements for Suggestions to minimise NPAs. Before testing the hypothesis for suggestions and exploring factors, reliability is checked with regard to the scale developed for the purpose of data collection. Tool used for this reliability testing is Cronbach's alpha for which ideal coefficient value is 0.7 or more. The questionnaire in this study contains 11 statements suggesting the ways to

reduce NPA in banks and the overall Cronbach's alpha for 11 suggestions is .848. It means that there is an acceptable degree of consistency among the responses against each item. In the present study, Exploratory Factor Analysis technique is applied in SPSS to obtain main suggestions for minimizing NPA in Banks. As a pre condition for applying EFA, its requirements are checked by executing Kaiser-Meyer-Olkin Measure of Sampling Adequacy and *Bartlett's Test of Sphericity* (Table 6.10). Kaiser-Meyer-Olkin Measure of Sampling Adequacy is .830 much higher than the minimum cut-off of .50. Thus it indicates that data is sufficient to run factor analysis. Another rule of thumb is that respondents and items should be in the ratio of 10:1. Here in the present study there are 372 respondents to get viewpoints on 11 suggestion items. Through *Bartlett's Test of Sphericity*, patterned relationships are confirmed among data (*significant level of p < .05*). *Varimax* rotation technique is used for which for which default value 25 rotation is selected which is usually sufficient for most analyses.

Factor Extraction and Rotation for Suggestions to Minimize NPAs

In this study, Factor analysis technique is applied tool for investigating various suggestions to reduce NPAs in the banks and efforts are made to collapse these 11 suggestions into three interpretable underlying factors. The key concept of factor analysis is that multiple observed variables have similar patterns of responses because they are all associated with a latent (i.e. not directly measured) variable. The Eigen value is a measure of how much of the variance of the observed variables a factor explains. Any factor with an Eigen value ≥ 1 explains more variance than a single observed variable. The relationship of each variable to the underlying factor is expressed by the so-called factor loading. Table 4 explains Factors and Factor Loadings of Suggestions to Minimize NPA Scale.

Table 4
Factors and Factor Loadings of Suggestions to Minimize NPA Scale (N=372)

Factor	Items	Factor Loadings
Proactive Measures (SFACT1)	Involvement of Associations of Corporate in recovering loans	.644
	Effective Corporate Governance in corporate body itself	.780
	Surveillance and Follow up of Credit Portfolio	.673
	Fixation of Responsibility centers in pre sanctioning appraisal and post disbursement supervision	.841
Efficient Recovery Systems (SFACT2)	Strengthening Credit Information Sharing System among banks regarding borrowers' repayment tendency	.804
	Cultivating efficient Market Intelligence System to know more about the credibility of their borrowers	.854
	Enhancing and Strengthening Recovery Measures	.644
	Asset Reconstruction Companies (ARCs) to expedite the recovery process	.516
BRM Borrower Relationship Management (SFACT3)	Moral Persuasion of borrowers toward timely repayment of their loans	.842
	Maintaining a Continuous rapport / Communication with the borrowers	.659
	Giving banks Liberty to reduce rate of interest for EWS (Economically Weaker Section)	.545

Testing of Hypothesis for Suggestions to Minimize NPAs

Three factors have been extracted as explained in Table 4. These three factors are the dimensions or variables which will be analysed in the subsequent sections in order to meet the requirement of Objective No. 2 and also for testing of hypothesis.

For Testing of Hypothesis purpose, mean scores have been computed. To examine whether Suggestions to minimize NPAs differ significantly between Public Sector Banks and Private Sector Banks, Null hypothesis is framed and an independent samples t test has been executed and the results are interpreted.

H₀

There is no significant difference between Dimensions for Suggestions to minimize NPAs Scale between the respondents of Public and Private Banks

The results as shown in Table 5 below indicate that there are no significant differences among the factors like Proactive Measures (t value = .552) and Efficient Recovery Systems (t value = 1.559). However, there are significant difference in BRM Borrower Relationship Management (t value = 4.333) at significant level .01. It shows that respondents believe that different efforts have been made by public sector and private sector banks while maintaining relationship with the borrowers and it might have an impact such that NPA of Private sector banks are better managed as compared to Public sector banks.

Table 5
Comparison of Dimensions of Suggestions to Minimize NPA Scale between the respondents of Public and Private Banks (N = 372)

Dimensions	Public (N=273)		Private (N=99)		t-value
	Mean	SD	Mean	SD	
Proactive Measures (SFACT1)	3.8736	.69403	3.8258	.85151	.552 ^{NS}
Efficient Recovery Systems (SFACT2)	4.0824	.64211	4.1970	.51294	1.559 ^{NS}
Borrower Relationship Management (SFACT3)	3.7289	.58139	3.4040	.77704	4.333 ^{**}

** Significant at .01 Level

* Significant at .05 Level

NS – Not Significant

Limitations of the Study

In this study, efforts have been made by the researcher to the best of her knowledge and ability. Data collected and analyzed in the present study pertains from March 2006 to March 2015. As a result whatever analysis is presented and whatever conclusions are drawn they are based on this ten years' data and is applicable only to that period. Another challenge faced, while pursuing this study was to establish direct contact with risk managers who are actually involved in the risk management of banks. So to identify the correct respondent whose realm of experience covers the subject matter of the

study was really a challenge. During primary data collection, lot of follow-up was required to get responses from bankers and risk managers due to their busy schedule and they were not willing to interact much. Thus, such type of studies require more cooperation and support from Bank personnel, only then correct inferences could be made. Thus, the viewpoints of the Bank Managers and RBI personnel could not be incorporated seeing the sensitivity of banking regulation and supervision making impact on Indian economy. However, observations made by experts in various Reports, dialect, journals, periodicals etc. were also integrated. Last but not the

least this analysis cannot be tested in laboratory as the observations are based on viewpoints of human beings which are highly sensitive in nature to the changing circumstances.

Suggestions

Major suggestions of the present analysis are as follows:

1. Risk Management Department needs to have knowledge of macroeconomics, statistical concepts; working of the financial markets, derivatives, technology and the risk inherent in them.
2. Most Indian Banks are Basel II compliant although with Standardized Approaches, efforts should be made to move towards advanced approaches like AMA (Advanced Measurement Approach), because they are more risk sensitive. However, for this purpose, Banks need to strengthen their IT systems and re-skill their personnel as a prelude to successful implementation of the Basel Accord Advanced Approaches.
3. Today's E-age requires Networking & Computerization of Branches and introduction of e-Banking which facilitates regulation and supervision of the Branches by their Central Offices as well as RBI.
4. Closer examination and supervision is mandatory in terms of capital adequacy and NPA along with extra provisioning to recover NPAs.

Conclusion

In this study, major cause of increasing NPA were identified through Factor analysis, such as unworthy borrower, inadequate and untrained human resource, wilful default, diversion of funds, deficiency in the credit appraisal standards and lack of supervision and follow-up. Besides, viewpoints of bankers were obtained with respect to suggestions to minimise NPAs. Such suggestions primarily included being effective in appraisal, supervision and follow-up of loan accounts, maintaining continuous relationship with the borrower and enactment of stringent legal system for defaulters. Based on the observations made from the survey and information obtained during the course of non-formal interviews or discussions, it can be concluded that banks need to be more attentive and alert in executing the whole process of lending and ensure continuous follow up. Efficient risk management entails that besides recovery of NPAs, main focus of the banks should be on the minimizing NPAs. For this steps need to be taken in correct direction through formation of effective and proactive risk management policies and procedures. Banks need to be updated with the present reality of complex economic environment along with implementing suitable recovery measures. Only then it will be possible for the government of India to be an active participant in the achievement of Sustainability Development Goals (SDGs) of UN.

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