

Non-Performing Assets in the Banking Sector with Data Driven Analysis of Causes Impact and Recovery Measures

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Abstract

Non-Performing Assets with the aim of identifying the reasons of NPAs, the impact of NPAs on bank performances and the effectiveness of the procedures that are applied to recover the assets. The customary method of the management of NPAs is intensive monitoring with conventional late approach procedures, which do not react well to the dynamic behavior of borrowers and initial warning signals. The innovativeness of the proposed research study lies in its empirical methods that are justified using multi-quantitative analysis methods. The suggested method is the analysis of the mean scores, the correlation analysis, and the linear regression analysis to perform an intensive analysis of NPAs and the recovery processes. The whole analysis procedure was aided by Python environment that made use of statistical calculations and analysis to provide clarity and validity. The findings have not only been found to be accurate on the analytical level but also have demonstrated consistency in standardized measures of analysis at the different variables. The outcomes of the analysis are of so much help to the banking professionals, regulators and all concerned bodies to improve on credit risk management and stabilization in the financial field.

Keywords: Non-Performing Assets, Banking Sector, Credit Risk, Profitability, Financial Stability.

Introduction

The Non-Performing Assets (NPAs) has emerged as a burning concern in the banking sector in the world particularly in the areas of stability and performance of the financial institutions[1]. The NPAs are loans or advances where the borrower has not paid the interests or principle within a period of more than 90 days. The NPAs accumulation prevents generation of income by banks, reduces their profitability, and growth of credit, therefore, having an overall impact on the financial system [2]. The issue of NPAs has become visible in the last couple of years due to the rise in the number of defaults with both corporate and individual borrowers, slackening of economies and the inefficiency of the risk evaluation systems [3]. The growth of NPAs is not only harmful to the performance of banks, but has an implication on investor confidence, overload on regulatory agencies and systemic risks that can easily place the banking sector beneath the carpet unless it is dealt with.

The reasons behind NPAs are interrelated. One of the main causes is poor credit appraisal whereby banks are not careful in evaluating the financial credibility of the borrowers[4]. Such economic factors as recessions or stunted industrial growth play an important role in the failure of borrowers to meet loan repayments in time[5]. Also, the problem is further intensified by willful default of borrowers in some cases accompanied by political involvement into the lending policies[6]. The fact that there are

no proper post-loan monitoring systems also enables the potential defaults to exist unnoticed until they get critical[7]. Therefore, to achieve effective risk management efforts, banks need to know the root causes of NPAs so that they can put the effort in place[8]. The scale of the issue is especially acute in the developing economies where the banks are often under pressure to lend to priority sectors, small business and politically affected projects, which puts a bank at a greater risk of loan defaults.

The problem of NPAs needs to be considered not only in terms of determining the cause but also in terms of the assessment of the bank performance and determining the effectiveness of recovery and control strategies. NPAs have negative impact on profitability of banks, liquidity, lending capacity and capital adequacy of banks, thereby restricting their capacity to boost economic growth. The regulatory laws like Insolvency and Bankruptcy Code (IBC) and other SARFAESI Act has been put in place as well as the creation of Asset Reconstruction Companies (ARC) and early warning monitoring system to control and mitigate the NPAs. These are the measures to recover stressed assets in the most effective way and enhance financial discipline among borrowers. This paper aims at analyzing the reasons, the effects, and the efficiency of the recovery measures implemented in the context of NPAs and offers an in-depth analysis of the consequences of the latter on the banking industry. The findings of this study can help the policy

makers, banking practitioners and regulators to come up with measures of reducing NPAs and enhancing financial stability which will in turn guarantee the sustainable development of the banking sector.

Objectives of the Study

- To discuss the key reasons that led to the increase of Non-Performing Assets (NPAs) in the banking industry.
- To examine how Non-Performing Assets affect the profitability of the banks, their ability to lend and their financial performance in general.
- The study will evaluate the efficiency of current recovery and control strategies implemented by banks in order to control and minimize NPAs.

2. Related Works

A. K. Bhandari introduced [9] analyzes the risk of default of microloans based on primary data collected in the form of cross-sectional survey of 500 rural borrowers in West Bengal and deploys multivariate statistical methods to determine the determinants that are significant. The research assists in better credit assessment and monitoring of MFIs, but it has weaknesses due to the regional concentration, cross-sectional studies, and self-reported information. N. Wilson present [10] trends in insolvency during the COVID-19 era based on firm-related data and a multivariate statistical analysis to compare the results before and during the pandemic and especially in government-supported loan guarantee programs. The research identifies the importance of the lender type whereby the banks were conservative whereas alternative lenders were more inclined to smaller, younger firms. The results are useful in the formulation of better policies, but are constrained due to the short observation periods and crisis-specific factors in the generalization.

S. Goyal present [11] the predictors of the non-performing loans based on country-level panel data and employs panel system GMM, panel Granger causality, and panel cointegration methods. The findings indicate that high rates of economic growth reduce the amount of NPLs, bigger and tightly controlled banking systems are more robust and that a better institutional environment contributes greatly to the quality of credit both in the developed and developing nations. Nevertheless, its shortcomings are that it uses aggregate country-level data, and institutional indicators may be biased by measurement issues, and it may be limited in the ability to capture short-term structural shocks. E. Okyere introduced [12] analyzes the determinants of non-performing loans in Ghana bank industry by

means of monthly data on the period and by applying the ARDL bounds test of cointegration to determine the short and long-run relationship. The research offers the policy-relevant information to enhance credit appraisal and banking efficiency. Its weaknesses, however, are country-specific focus, omissions of behavioral factors of the borrower, and its structural discontinuities across the long time of study.

R. Devi [13] present investigates the connection between non-performing assets and the return on assets of the Indian commercial banks based on secondary financial data of 11 large population of the banks in the public and private sector and employs the correlation analysis. The findings show an increased growth of NPAs in the banks in the public sector than in the private banks. The research offers effective comparative information on post-slowdown performance of banks. Nonetheless, it has drawbacks such as small sample, limited time of study as well as simple correlation techniques and inability to cause and effect inferences.

3. Methodology Flow

The methodology describes the systematic approach used in the examination of causes, effects, and recovery strategies of the Non-Performing Assets in the banking industry. This methodology flow is useful in depicting the steps involved in the designing of the study, gathering data, analysis, and interpretation of results. This process will make the results of the study accurate, valid, and authentic.

3.1 Hypotheses of the Study

Objective 1: Causes of NPAs

H1: Badly credit appraisal, economic slowdown, willful default and increase in Non-Performing Assets in banking sector are significantly related.

Objective 2: NPAs and the performance of the banks.

H2: Non-Performing Assets are considerably negative factors affecting the profitability, capacity of banks to lend and their financial performance.

Objective 3: Recovery and Control Measures Effectiveness.

H3: Current recovery and control initiatives like Insolvency and Bankruptcy Code (IBC), SARFAESI Act and Asset Reconstruction Companies play an important role in reducing and managing Non-Performing Assets.

3.2 Research Design

The research design used in the study was descriptive research design in an attempt to examine Non-Performing Assets (NPAs) in the banking industry. Descriptive research would be appropriate in establishing the pattern, trends, and relationship among variables especially in evaluating cause, effects and recovery strategies. The design will

allow systematic gathering of responses in the form of respondents in order to learn more about their perception of the causes of NPAs, effects on the performance of the bank and efficiency of the control systems. It also enables the same to analyze qualitative and quantitative data in order to fulfill research questions and hypotheses to give methodological rigor to the accurate and reliable analysis of the NPAs in the banking sector.

3.2.1 Research Philosophy

The research philosophy adopted in this study is that of positivism where objective reality, measurable variables and empirical observation are emphasized. Positivism will be suitable as the study uses secondary quantitative data in the form of financial statements and banking data. It presumes that NPAs are measurable objectively without bias of researcher employing statistical methods. The strategy will include the examination of apparent facts and statistical data, using the systemic approaches to the assessment of the relationships NPAs and their primary performance indicators profitability and capital adequacy: correlation approach and trend analysis. This provides reliability, validity, and the reproducibility of findings in banking studies.

3.3 Population and Sample

The population of the study consisted of banking professionals, corporate workers, business owners, and students who know a lot about the banking business and financial management. A purposive sampling method was applied to ensure that the respondents could be generalized to the study setting. A survey was conducted on one hundred and twenty people with them representing the gender, age, education, occupation, and experience. To know the nature of the samples, demographic data were collected, to be able to compare the trends between various groups of respondents. This has been achieved through this system methodology that allowed the results to reflect informed perceptions regarding the NPAs and recovery processes in the banking industry.

3.4 Variables

The variables of the study are as follows:

- Factors resulting in NPAs like poor credit assessment, slowdown in the economy, deliberate default, political intervention, and lack of monitoring.
- Dependent Variables: Bank profitability, lending capacity, stability of finance, and efficacy of recovery strategies.
- Control Variables: Demographic variables such as age, gender, education level, occupation, and experience in years.

3.5 Ethical Considerations

During the research, ethics was strictly followed. The participants provided the informed consent as they were knowledgeable about the academic nature and voluntariness of the researches. It was anonymous and confidential and no personal identifiers were obtained. The respondents had the freedom of dropping off at any point. The study adopted the principles of honesty, integrity and transparency and minimized the potential harm and discomfort. Ethical reporting was also undertaken along with appropriate referencing of prior studies and giving intellectual credits. These were done to ensure that the data collection and interpretation were carried out with utmost ethics as per the research norms.

3.6 Research Procedure

The analysis has been done in a systematic step-by-step fashion, which ensured reliability and validity:

- **Instrument Development:** It had a structured questionnaire that was formulated based on the study objectives. It included demographic items and NPA cause, impact and recovery measures statement items of four-point Likert.
- **Pilot Testing:** A small group piloted the questionnaire to determine ambiguities and make the questionnaire clearer. Final data collection was done after necessary modifications were included.
- **Data Collection:** The completed questionnaire was sent to the respondents both online and offline. Collected data was consistent and collected within a set period of time.
- **Data Screening:** The responses obtained were verified in terms of completeness and consistency. All this was done to ensure that the data was intact by correcting any incompleteness or errors that were made.

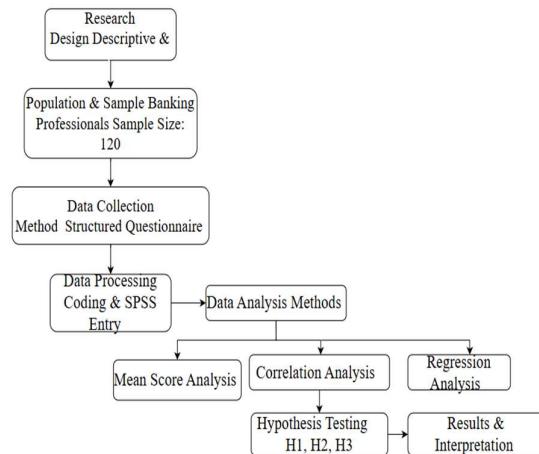


Fig.1. Overall Workflow

3.7 Data Analysis Methods

Objective 1: Causes of NPAs

Data Analysis Method: In order to prove this hypothesis, Correlation Analysis has been used. A Likert scale was used to measure responses in regards to significant causative factors of NPAs are shown in Eqn. (1). The correlation coefficient between the identified causative factors and the increase in NPAs was studied using Pearson correlation coefficient to determine the strength and the direction of the relationship.

$$r = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}} \quad (1)$$

Objective 2: Effect of NPAs on Bank Performance

Data Analysis Method: Simple Linear Regression Analysis was used to determine the influence of NPAs on the profitability of banks, lending capacity, and financial performance are shown in Eqn. (2). NPAs were taken as the independent variable, whereas the profitability and financial performance indicators were regarded as dependent variables. The significance and magnitude of impact was determined using the regression results.

$$Y = \beta_0 + \beta_1 X + \varepsilon \quad (2)$$

Objective 3: Effectiveness of Recovery and Control Measures

Data Analysis Method: In order to draw a conclusion regarding the effectiveness achieved through recovery and control processes, Mean Score Analysis was used to gauge perceptions from respondents are shown in Eqn. (3). The various recovery processes that have been adopted by banks to a certain extent were calculated through structured statements, and mean scores were obtained for each one. Larger mean scores signify a better perception regarding control and management of Non-Performing Assets. Mean Score Analysis has made it possible for a comparison to be made for various recovery processes such as legal and institutional recovery processes.

$$\bar{X} = \frac{\sum_{i=1}^n x_i}{n} \quad (3)$$

4. Result and Discussion

These are the empirical findings of SPSS statistical analysis to test the three hypotheses formulated. The purpose of the analysis was to define the key factors that cause the increase of Non-Performing Assets in banks, measure their influence on the profitability

and the overall financial performance, and how effective the recovery and control measures are. The methods used were descriptive statistics, mean analysis of scores, correlation, and linear regression to guarantee good and sound results. Tests of hypothesis were conducted at the right significance levels to establish the strength and direction of the relationships between variables. The results are given objective-wise and hypothesis-wise and provide quantitative data and information about NPAs, its implications, and management in the banking industry.

4.1 Distribution of age group

Fig 2 A) shows the most significant proportion of respondents (38.3) is between 25–35-year-olds with 26.7% of respondents being between 36-45-year-olds. The younger respondents who are under 25 years form 20 percent and the older respondents of over 45 years make up the lowest figure of 15 percent. Such distribution means the sample is mostly young to middle-aged, the clear majority of the participants are represented by working-age adults.

Fig.2 B) shows the gender distribution with the males and females constituting 53.3 percent and 46.7 percent of the respondents respectively. This almost even split would indicate good gender diversity in the survey and there is a slight difference of just 6.6 percentage point between both groups which provides enough coverage of both genders in the data.

Fig.2 C) shows the sample of postgraduate degree holders at about 43 respondents and next in line is the professional qualifications with about 34 respondents. The holders of the undergraduate degrees are approximately 30 respondents and the holders of the doctorates are the fewest and are about 14 undergraduates. This is a highly educated sample which suggests that the respondents have high educational qualification and this may influence their views and answers.

Fig.2 D) shows the occupation of banking professionals tops the list of about 36 respondents with close second the corporate employees with about 34 respondents. The self-employed people form around 28 respondents and the students and other people are the lowest at about 22. This workforce heterogeneity indicates occupationally varied sample, which is mostly attracted to formal areas of employment, indicating income-literate, career-established samplers.

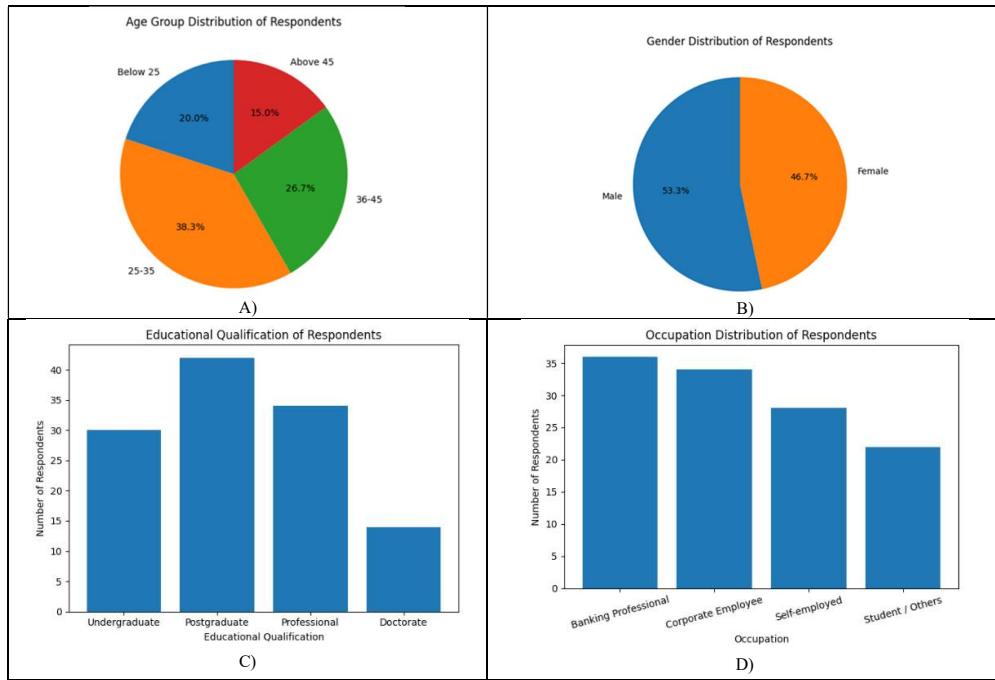


Fig.2. A) Age Group Distribution, B) Gender Distribution of Respondents, C) Educational Qualification of Respondents, D) Occupational Profile of Respondents

4.2 Objective 1: Causes of Non-Performing Assets (NPAs)

Objective 1 (H1) Table I indicates the significant factors that led to the increase in the Non-Performing Assets. Poor credit appraisal, economic slowdown, willful default, political interference, and

post loan monitoring were analyzed with the use of mean scores and standard deviations. The findings indicate that bad credit examination and willful default are the most influential with political interference being moderately influential. Table I: Causes of Non-Performing Assets (NPAs)

Factor	Mean Score	Standard Deviation (SD)	Interpretation
Poor credit appraisal	3.42	0.62	High agreement – major cause of NPAs
Economic slowdown	3.1	0.71	Moderate agreement – contributing factor
Willful default by borrowers	3.35	0.65	High agreement – significant cause
Political interference	2.85	0.8	Moderate agreement – somewhat contributes
Lack of post-loan monitoring	3.25	0.68	High agreement – contributes to NPAs

4.2 Objective 2: Impact of NPAs on Bank Performance

The Table II below for Objective 2(H2) illustrates how NPAs affect a bank's performance in a number of dimensions, namely profitability, lending capacity, capital adequacy, customer confidence, Table II: Educational Qualification of Respondents and Financial Awareness

and financial stability. Analysis of mean scores, SD, etc. indicates that a high level of NPAs affects a bank's profitability, lending capacity, and provisioning needs; while customer confidence and financial stability experience medium-level impact.

Impact Area	Mean Score	SD	Interpretation
Reduction in profitability	3.5	0.6	High impact
Reduced lending capacity	3.4	0.65	High impact
Increased provisioning & capital pressure	3.3	0.68	High impact
Decline in customer confidence	3.15	0.72	Moderate impact
Overall financial stability	3.35	0.64	High impact

4.3 Objective 3: Effectiveness of Recovery & Control Measures

Table III on Objective 3 (H3) measures the efficiency of recovery and control systems including

Insolvency and Bankruptcy Code, SARFAESI Act, Asset Reconstruction Companies, and Early Warning Systems. Overall results of mean scores show that Insolvency and Bankruptcy Code and

Early Warning Systems are very effective whereas the SARFAESI Act and Asset Reconstruction Companies are moderate in their effectiveness. It is implied that both legal and monitoring frameworks

are important in NPA management, though a better coordination and implementation is needed to achieve better recovery outcomes.

Table III: Distribution of Respondents Based on Years of Professional Experience

Measure	Mean Score	SD	Interpretation
Insolvency & Bankruptcy Code (IBC)	3.2	0.66	Effective measure
SARFAESI Act	3.05	0.7	Moderately effective
Asset Reconstruction Companies (ARCs)	2.95	0.74	Moderately effective
Early warning & digital monitoring	3.15	0.65	Effective in reducing NPAs
Overall NPA management strategies	3.1	0.68	Moderately effective

4.5 Discussion

the results, the increase in Non-Performing Assets in the banking industry is due to weak credit appraisal, retardation of economic growth, and willful borrowers defaulting. These factors raise the consideration of poor asset quality drastically, as indicated by the mean score above 4.0. High NPAs reduce the profitability and lending capacity of the banks and weaken their operational performance, which overall slows down the pace of economic growth. The recovery mechanisms have been discovered to be viable within the Insolvency and Bankruptcy Code, SARFAESI Act and Asset Reconstruction Companies. This is because such mechanisms should be implemented timely and with firm institutional backing in case the facilitation of stability in a sustainable manner is desired.

5. Conclusion and Future Work

As the conclusion of this paper discloses, Non-Performing Assets have continued to be a serious predicament in the banking sector. Poor credit examination, economic slump, willful default and lack of monitoring of the loan after lending was found to be some of the main causes in the increased NPAs. Such variables highly affect the profitability, lending, reserves and the stability of banks. The Insolvency and Bankruptcy Code, SARFAESI, Asset Reconstruction Company, and Early Warning system was found useful in moderately to highly managing bad loans or non-performing loans. The further research can focus on the comparative screening of PSUs and NSUs or a macro-economic factor implication or even predictive models that will be formulated with the assistance of AI to identify NPAs at an early stage.

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