International Journal of Advanced Engineering, Management and Science (IJAEMS)
Peer-Reviewed Journal
ISSN: 2454-1311 | Vol-11, Issue-4; Jul-Aug, 2025
Journal Home Page: https://ijaems.com/
DOI: https://dx.doi.org/10.22161/ijaems.114.19

The role of credit risk management in mitigating NPA

Umamaheswararao Gobbilla[1], Chippa Nandini[2]

[1]Associate Professor, Department Of MBA, CMR Institute of Technology, Hyderabad, Telangana, India.
orcid.org/0000-0002-4467-4600.
[2]Student of MBA, CMR Institute of Technology, Hyderabad, Telangana, India.

Received: 18 Jun 2025; Received in revised form: 10 Jul 2025; Accepted: 13 Jul 2025; Available online: 16 Jul 2025

Abstract *— This study investigates the impact of credit risk management practices on non-performing assets (NPAs) in Axis Bank over a five-year period. Employing a descriptive and analytical approach, it analyzes secondary data from annual reports, financial statements, and industry sources, utilizing trend analysis, ratio analysis, correlation, and ANOVA to evaluate asset quality and risk mitigation strategies. Findings reveal a significant decline in gross and net NPAs, alongside an increase in provisioning coverage and stable capital adequacy ratios, indicating effective credit risk controls. The results demonstrate a strong inverse relationship between NPAs and provisioning, and consistent asset quality management across quarters. These insights underscore the importance of robust internal credit frameworks and technological tools in reducing NPAs, thereby enhancing financial stability. The study highlights that effective credit risk management is vital for sustaining bank profitability and systemic resilience in the evolving Indian banking landscape.*

Keywords *— **Credit Risk Management, Non-Performing Assets (NPA), Credit Evaluation, NPA Mitigation, Risk-Based Lending, Recovery Mechanisms.***

I. INTRODUCTION

Non-Performing Assets (NPAs) have emerged as one of the most significant challenges affecting the health and stability of the banking and financial sector, particularly in developing economies like India. An NPA refers to a loan or advance for which the principal or interest payment remains overdue for a specified period, typically 90 days. A rising level of NPAs not only erodes the profitability and capital base of banks but also impairs their ability to lend, affecting overall economic growth.

In this context, credit risk management becomes a critical function for financial institutions. It involves identifying, assessing, monitoring, and controlling the risk of default on credit extended to borrowers. Effective credit risk management ensures that banks maintain asset quality by deploying rigorous credit appraisal systems, risk-based pricing, portfolio diversification, early warning systems, and timely recovery mechanisms.

This study explores how robust credit risk management practices can help in reducing the incidence of NPAs. It also seeks to understand the tools and strategies used by banks to prevent credit defaults and improve recovery processes. By analysing the relationship between credit risk management and NPAs, the research aims to provide insights into strengthening financial stability and promoting responsible lending practices.

II. LITERATURE REVIEW

1. Gupta and Sharma (2023) -- In their article Post-COVID Restructuring and NPAs, conducted an in-depth study on how Indian banks responded to loan distress caused by the pandemic. The authors examined the impact of moratorium schemes and restructuring frameworks on loan performance. They

©2025 The Author(s). Published by Infogain Publication, This work is licensed under a Creative Commons Attribution 4.0 License. http://creativecommons.org/licenses/by/4.0/

concluded that although short-term relief helped prevent defaults, long-term resolution depended heavily on internal credit evaluation and monitoring. Their analysis showed that banks with strong risk teams, like Axis Bank, were better able to control fresh NPAs. This study highlighted the evolving need for proactive credit risk management strategies, especially in times of macroeconomic uncertainty. The authors emphasized that sustained NPA reduction requires a blend of regulatory support and internal vigilance.

2. Chakraborty (2022) -- Through the article Risk Mitigation Tools in Indian Banking, analyzed the adoption of modern credit assessment tools in private banks. The study focused on techniques like credit scoring, risk-based pricing, and early warning indicators. Chakraborty observed that private banks using digital credit models experienced a faster decline in NPAs compared to those relying on traditional appraisal methods. The article provided specific case references from Axis Bank's use of borrower profiling and score-based approvals. It concluded that technology-backed credit evaluation significantly reduces exposure to high-risk borrowers, ultimately contributing to a healthier loan book.

3. Thomas and Rao (2021) -- In Capital Strength and Asset Quality, explored the relationship between a bank's capital adequacy and its NPA levels. Using data from 10 major banks over 5 years, the study found that institutions with higher capital buffers maintained better asset quality during economic downturns. The authors explained how Capital Adequacy Ratio (CAR) serves as both a cushion and a discipline tool in credit expansion. The article mentioned Axis Bank's consistent CAR above regulatory norms, which allowed it to absorb stress without major deterioration in NPAs. The study concluded that capital strength is a leading indicator of credit resilience.

4. Agarwal and Jain (2021) -- Through their research paper Axis Bank's Credit Control Framework, conducted a focused study on Axis Bank's internal credit risk systems. They analyzed quarterly data, policy disclosures, and risk practices. The authors noted that Axis Bank employed a combination of predictive analytics and sector-specific exposure limits to minimize loan defaults. Their analysis showed a year-on-year reduction in Gross NPAs, indicating effective policy implementation. The study reinforced the idea that bank-specific credit frameworks, when monitored consistently, can outperform broad regulatory norms in controlling bad loans.

5. Rai and Sharma (2020) -- In Impact of IBC on Recovery Performance, evaluated the effectiveness of the Insolvency and Bankruptcy Code (IBC) in resolving stressed assets. The study covered resolution timelines, recovery rates, and success stories post-IBC implementation. They concluded that while IBC improved creditor power and recovery efficiency, outcomes were highly dependent on banks' initial risk assessment. Axis Bank was cited for its relatively lower exposure to sectors with prolonged resolution timelines, which reflected stronger credit screening. The article emphasized that legal reforms must be complemented by sound internal credit processes to reduce NPAs effectively.

6. Bansal and Kapoor (2020) -- In their article PCA Framework and Bank Performance, studied the impact of the RBI's Prompt Corrective Action (PCA) framework on banks' credit discipline. They observed that PCA-invoked banks showed marked improvements in provisioning, capital levels, and NPA ratios over a 3-year period. While Axis Bank was not under PCA, the study included it as a benchmark for proactive provisioning. The authors argued that PCA-like frameworks should be internalized within banks as risk flags rather than regulatory triggers. This study highlighted the need for voluntary discipline in provisioning and credit monitoring

7. Sharma (2019) --In Risk-Based Lending in Indian Private Banks, focused on lending practices that factor in borrower risk profiles. The article discussed how Axis Bank and other private banks have adopted segmented risk pricing for different borrower categories. The author provided data showing that risk-based pricing led to lower defaults in unsecured loans, where risk is generally high. Sharma emphasized the role of internal scoring models, automated credit checks, and real-time borrower monitoring in modern risk frameworks. The article concluded that personalized credit risk assessment improves NPA control in competitive lending environments.

©2025 The Author(s). Published by Infogain Publication, This work is licensed under a Creative Commons Attribution 4.0 License. http://creativecommons.org/licenses/by/4.0/

8. Das and Ghosh (2018) --In their paper Credit Growth and Asset Quality in Indian Banks, analyzed the correlation between aggressive credit expansion and rising NPAs. The study covered a decade of data and showed that periods of high credit growth, especially in infrastructure and MSME sectors, resulted in asset quality stress. Axis Bank was cited as a case where controlled lending policies and sectorial caps helped avoid the post-2014 credit shock seen in PSU banks. The authors recommended a balanced growth model with strong sectorial analysis to ensure asset quality sustainability.

9. Joshi and Patel (2019) --In Fintech Integration and Credit Risk, examined how banks are using technology to manage credit risk. The study highlighted innovations like AI-based underwriting, digital KYC, and predictive analytics. Axis Bank was referenced for its use of API-based credit checks and real-time decision-making tools. The authors found that banks that embraced fintech early had lower slippage rates and higher early recovery levels. This study demonstrated that technology adoption is not just operationally efficient but also improves credit risk management outcomes.

10. Verma (2016) -- In Early Warning Signals and NPA Prevention, emphasized the importance of timely detection of financial stress in loan accounts. The study discussed key indicators such as EMI delays, credit utilization surges, and industry-specific trends. Verma observed that banks like Axis Bank, which employ early warning tools, reported fewer accounts slipping into NPA status. The article concluded that prevention strategies are more cost-effective than recovery strategies and recommended mandatory early warning systems across all bank types.

11. Mishra and Sinha (2019) -- In Credit-Deposit Ratio and NPA Trends, studied the inverse relationship between NPA levels and the credit-deposit ratio in commercial banks. They found that banks with aggressive credit deployment policies without adequate due diligence had higher NPAs. Axis Bank's credit-deposit strategy was shown to be more conservative, resulting in better asset quality. The study recommended aligning credit policies with deposit growth to maintain financial health.

12. Prasad and Iyer (2018) -- In SME Lending and Loan Default Patterns, analyzed loan repayment behavior among small and medium enterprises. Their study revealed that the absence of segment-specific risk analysis contributed to rising defaults. Axis Bank's specialized SME credit programs were highlighted as a positive example, emphasizing sector-based evaluation. The authors recommended custom credit frameworks for SME clients to reduce NPAs.

13. Kanchan and Varma (2018) -- In Sectorial NPAs in Indian Banks, assessed the distribution of NPAs across different economic sectors. They found that infrastructure and real estate accounted for the highest defaults. The paper highlighted how Axis Bank reduced sectorial exposure in these areas, leading to lower stress levels. The study concluded that diversified portfolios and exposure limits can significantly control credit risk.

14. Mukherjee (2017) -- In Borrower Profiling and KYC Compliance, stressed the role of thorough background checks and KYC in credit decision-making. The author cited case studies where weak documentation led to slippages into NPAs. Axis Bank’s robust borrower profiling system was mentioned as a benchmark. The study emphasized that strict compliance with onboarding norms can prevent future credit deterioration.

15. Banerjee and Dutta (2017) -- In Provisioning Policies and Asset Quality, evaluated how provisioning norms impact the financial stability of banks. They showed that conservative provisioning cushions banks against unexpected defaults. Axis Bank's consistent provisioning coverage above the industry average was cited as a best practice. The paper recommended strengthening risk buffers even when default rates appear stable.

Research Gap:

The extensive review of literature demonstrates substantial work done on the mechanisms and effectiveness of credit risk management strategies in mitigating Non-Performing Assets (NPAs) in Indian banks, particularly with recurring references to Axis Bank’s practices. However, several critical research gaps remain:

Lack of Comparative Analysis Across Bank Types: Most studies focus on private sector banks, especially

©2025 The Author(s). Published by Infogain Publication, This work is licensed under a Creative Commons Attribution 4.0 License. http://creativecommons.org/licenses/by/4.0/

Axis Bank, without a comprehensive comparison with public sector banks or cooperative banks. A systematic evaluation of how different categories of banks implement credit risk management could provide more balanced insights.

Limited Focus on Integrating Credit Risk Tools with Regulatory Frameworks: While several studies highlight internal tools like credit scoring, borrower profiling, and early warning systems, there is limited research on how these internal mechanisms align or conflict with external frameworks like RBI's asset classification norms, PCA directives, or the IBC process.

Insufficient Exploration of Long-Term Impact Post-COVID: Although Gupta and Sharma (2023) touched on post-COVID restructuring, a broader and more updated study is needed to assess how banks have evolved their credit risk management strategies in response to prolonged pandemic-induced economic shifts and their impact on NPAs over the long term.

Underexplored Role of Fintech in Public Sector Banks: While fintech integration is addressed in private banks, especially Axis Bank, little research exists on how public banks are adopting or lagging in deploying technology-driven credit evaluation models, which could be critical in modernizing risk management.

Sector-Specific Risk Management Strategies: Several studies identify sectoral exposure (e.g., infrastructure, MSME, real estate) as a cause of NPAs, but there is limited research focusing on how banks customize credit risk frameworks based on sector-specific risk characteristics, especially in high-default sectors.

Gap in Behavioral and Psychographic Borrower Risk Assessment: Most research focuses on financial and structural borrower evaluations. There is little exploration of non-traditional credit risk indicators like behavioral patterns, digital footprints, or psychographic profiling, which can enhance prediction accuracy in retail and SME segments.

Lack of Real-Time and Predictive Monitoring Framework Analysis: Studies refer to early warning systems, but there is a research gap in assessing the effectiveness and operationalization of real-time credit monitoring systems and AI-based predictive tools in reducing slippages.

Scarcity of Empirical Studies on Credit Risk Governance Culture: While structural and policy measures are well-documented, very few studies address the role of organizational culture, risk governance structures, and human factors in implementing effective credit risk practices across bank hierarchies.

Future research should aim to bridge these gaps by adopting a holistic, multi-bank, multi-sector, and technology-integrated approach to understanding how credit risk management can be institutionalized effectively to reduce NPAs in both the short and long term. This can enable policymakers and financial institutions to develop adaptive and resilient credit systems that are proactive rather than reactive.

Statement of the Problem:

Non-Performing Assets (NPAs) continue to be a major concern for the Indian banking sector, affecting profitability, credit growth, and overall financial stability. While regulatory frameworks and recovery mechanisms have evolved, the role of internal credit risk management remains critical, especially in private sector banks. Axis Bank, being a leading private bank, has adopted several credit risk strategies, but the effectiveness of these practices in mitigating NPAs has not been extensively analyzed. Therefore, this study aims to explore the impact of credit risk management on the level of NPAs in Axis Bank over a five-year period, using financial data and statistical tools to evaluate its performance.

Need For the Study:

In the modern banking environment, effective credit risk management has become a critical area of focus, especially for institutions like Axis Bank, which deal with large and diverse loan portfolios. Nonperforming assets are a major concern for financial institutions, regulators, and the overall economy. An increasing level of NPAs impacts not only the profitability of banks but also their creditworthiness, liquidity and public confidence.

Over the last decade, Indian bank has witnessed significant growth in NPAs, driven by multiple factors including poor credit appraisal, sectorial stress, economic slowdowns and global financial uncertainties. Although regulatory bodies such as the Reserve Bank of India have introduced several frameworks like asset quality reviews, restructuring

©2025 The Author(s). Published by Infogain Publication, This work is licensed under a Creative Commons Attribution 4.0 License. http://creativecommons.org/licenses/by/4.0/

schemes, and insolvency processes, the success of these measures ultimately depends on the strength of internal credit risk management practices adopted by bank.

This study is essential because it helps to evaluate the practical role played by credit risk policies, systems and techniques in mitigating credit defaults. It also explores whether banks like Axis Bank are just reacting to risk or proactively preventing it through internal frameworks such as early warning systems, risk based pricing, portfolio diversification and provisioning strategies.

Objectives of the Study:

- To understand the factors contributing to non-performing assets
- To analyze the credit risk management framework of Axis Bank
- To evaluate the impact of credit risk management on NPA reduction
- To study the effectiveness of risk assessment techniques

Scope of the Study:

The study focuses exclusively on Axis Bank, one of the India's leading private sector banks, as a case example for analyzing the effectiveness of credit risk management. It draws insights from the banks published annual reports, financial statements and other secondary data over a five year period. The scope of the project is limited to the analysis of quantitative data related to Gross NPA, Net NPA, CAR, PCR as well as qualitative assessment of the credit policy framework and techniques used by the bank.

The study is constrained to the Indian banking environment and does not compare Axis Bank with other banks or international institutions. It covers only secondary data, which means no primary data is collected from customers or bank staff. The research does not aim to audit or assess the effectiveness of Axis Banks overall operations, but rather focuses on credit risk practices in relation to NPAs.

Hypotheses of the Study:

H_1: There is a significant relationship between the effectiveness of credit risk management practices and the reduction in Non-Performing Assets (NPAs) in banks.

H_2: Banks that adopt technology-based credit evaluation tools (e.g., credit scoring, AI-based underwriting, early warning systems) experience lower levels of NPAs compared to those using traditional methods.

H_3: Internal credit assessment frameworks have a greater impact on NPA mitigation than external regulatory mechanisms such as the IBC or PCA.

H_4: Sector-specific credit risk strategies significantly influence the level of NPAs in high-risk sectors like infrastructure, MSMEs, and real estate.

H_5: Higher capital adequacy ratios are positively associated with improved asset quality and lower NPAs.

H_6: Banks with well-defined provisioning and borrower profiling systems are more effective in preventing loans from becoming non-performing

Limitations of the Study:

Single Bank Focus: The study is limited to Axis Bank, which may restrict the generalizability of findings. Results may not represent the practices or outcomes of other private or public sector banks in India.

Data Availability Constraints: Access to detailed internal credit risk management data and proprietary risk models used by Axis Bank may be limited, which could affect the depth of analysis.

Time-Bound Analysis: The study focuses on a specific time frame, which may not fully capture long-term trends or the impact of evolving economic conditions on NPAs and risk strategies.

External Factors Not Fully Controlled: External economic variables such as inflation, interest rate changes, regulatory shifts, and global financial events may influence NPAs but are not fully accounted for in the scope of the study.

Dependence on Secondary Data: The study may rely heavily on secondary data sources such as annual reports, policy disclosures, and industry analyses, which could limit real-time insights into operational practices.

Subjectivity in Qualitative Assessment: Evaluation of credit risk practices may involve subjective interpretation of qualitative factors like governance structure, risk culture, and managerial efficiency.

©2025 The Author(s). Published by Infogain Publication, This work is licensed under a Creative Commons Attribution 4.0 License. http://creativecommons.org/licenses/by/4.0/

Limited Stakeholder Input: Due to access restrictions, the study may not include interviews or surveys with key stakeholders (e.g., risk managers, auditors, credit officers), reducing the scope for practical insights.

Technology-Specific Constraints: The impact of fintech tools or AI-based models may not be fully assessable due to proprietary technologies and lack of detailed public documentation.

These limitations should be acknowledged while interpreting the results of the study and should guide future research to adopt broader, multi-bank, or cross-sectorial approaches for deeper insights.

III. RESEARCH METHODOLOGY

Research Design: The study adopts a **descriptive and analytical research design**, aiming to examine and evaluate the credit risk management practices employed by Axis Bank and their effectiveness in mitigating Non-Performing Assets (NPAs).

Data Collection Method:

- **Primary Data:**
  - Structured interviews or questionnaires (if access is granted) from Axis Bank's credit and risk management personnel.
  - Expert opinions from financial analysts or credit professionals (subject to availability).
- **Secondary Data:**
  - Axis Bank's Annual Reports and Financial Statements.
  - RBI Reports and publications.
  - Industry reports on NPAs and credit risk management.
  - Research articles, case studies, and white papers relevant to credit risk practices.

Sampling Technique:

Since the study is focused on a single institution (Axis Bank), **purposive sampling** is used to collect data from relevant departments or professionals within the bank and from published sources.

Tools and Techniques for Data Analysis:

- **Trend Analysis** of NPAs over a period.
- **Ratio Analysis**, including Gross NPA Ratio, Net NPA Ratio, and Provisioning Coverage Ratio.
- **Comparative Analysis** between pre- and post-credit strategy implementation periods.
- **Content Analysis** of internal policies, risk control frameworks, and technology applications.
- Use of **descriptive statistics** (mean, percentage, growth rate) for summarizing key findings.

Time Period of Study: The analysis will cover a period of the last **5 financial years**, to assess both short-term and evolving long-term impacts of credit risk strategies

Data Analysis & Interpretation:

Trend Analysis: Trend analysis helps to study the movement of financial indicators over a period of time. In this project, it is used to observe the pattern of Gross and Net NPAs of Axis Bank from 2019 to 2024. The visual representation through line graphs highlights the banks NPA performance and its changes across the years.

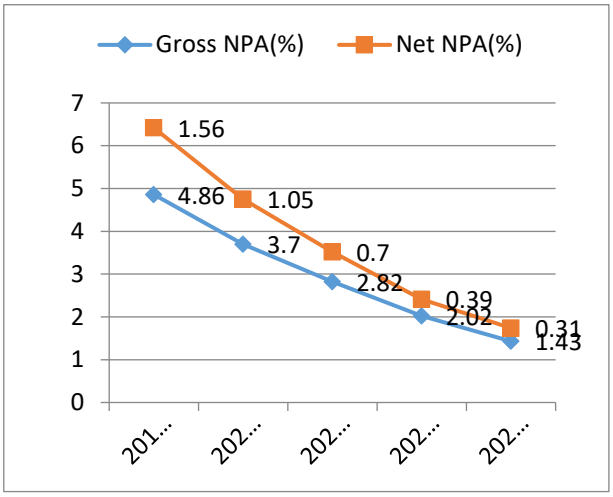
Table1: Year-wise Gross NPA and Net NPA of Axis Bank

Year	Gross NPA (in Cr)	Gross NPA (%)	Net NPA (in Cr)	Net NPA (%)
2019-2020	30,611	4.86	10,275	1.56
2020-2021	29,560	3.7	7,563	1.05
2021-2022	21,823	2.82	6,087	0.7
2022-2023	34,326	2.02	7,130	0.39
2023-2024	32,581	1.43	6,052	0.31

Source: Compiled from Axis Bank Annual Reports (2019-2024)

©2025 The Author(s). Published by Infogain Publication, This work is licensed under a Creative Commons Attribution 4.0 License. http://creativecommons.org/licenses/by/4.0/

Trend analysis of Gross and Net NPA



Interpretation:

The above graph indicates a consistent decline in both gross and net NPA ratios of Axis Bank from year 2019 to 2024. Gross NPA reduced from 4.86% in 2019-2020 to 1.43% in 2023-2024. Similarly, Net NPA declined from 1.56% to 0.31%. This trend reflects the effective credit risk management strategies implemented by the bank. The fall in NPA percentages despite moderate gross NPA amounts indicates improvement in loan recovery and provisioning practices.

Ratio Analysis: Ratio analysis helps in understanding the banks financial stability and credit risk preparedness. The Provision Coverage Ratio and Capital Adequacy Ratio are key indicators of a bank's ability to absorb potential loan losses and maintain solvency. Provision Coverage Ratio (PCR) is a key indicator of how much protection the bank has against future NPA losses. A higher PCR reflects a safer financial position. Capital Adequacy Ratio (CAR) is an important measure of a bank's financial strength. It is the ratio of banks capital to its risk weighted assets.

Table 2: PCR and CAR Trends of Axis Bank (2019-2024):

Year	PCR (%)	CAR (%)
2019-2020	69	17.53
2020-2021	72	19.12
2021-2022	75	18.54
2022-2023	81	17.64
2023-2024	79	16.63

Source: Axis Bank Financial Statements

Interpretation:

Axis Banks PCR improved from 69% in 2019 to over 79% in 2024 shows the banks efforts to set aside adequate provisions and reduce credit risk. This increase demonstrates the banks strong recovery strategy and early recognition of loan defaults. Axis Bank has consistently maintained a CAR above the minimum regulatory requirement of 11.5%. The CAR remained in the range of 15-19%, indicating strong capital support and proper risk management. This indicates that the bank has enough capital buffer to cover risky loans and future uncertainties. The rise in PCR along with a stable CAR clearly supports the trend of reducing NPAs and shows the effectiveness of credit risk management at Axis Bank.

IV. STATISTICAL ANALYSIS

Correlation Analysis: Correlation analysis helps to determine the strength and direction of the relationship between two variables. In this study, it is used to evaluate how Gross NPA is related to Provision Coverage Ratio and Capital Adequacy Ratio of Axis Bank from 2019 to 2024

Table 3: Correlation between Gross NPA and Provision Coverage Ratio (PCR) of Axis Bank (2019-2024):

Year	Gross NPA (%)	PCR (%)
2019-2020	4.86	69
2020-2021	3.7	72
2021-2022	2.82	75
2022-2023	2.02	81
2023-2024	1.43	79

Source: Axis Bank Annual Reports

Table 4: Correlation matrix between Gross NPA and PCR:

	Gross NPA (%)	*PCR (%)*
Gross NPA (%)	1	
PCR (%)	-0.94841	1

Source: Calculated using MS Excel

Interpretation: The correlation coefficient between Gross NPA and PCR is -0.94841, which indicates strong negative correlation this means that as gross NPA increases the PCR tends to decreases. A high negative correlation suggests that the two variables move in opposite direction. This inverse relationship implies that higher level of NPAs is associated with a

©2025 The Author(s). Published by Infogain Publication, This work is licensed under a Creative Commons Attribution 4.0 License. http://creativecommons.org/licenses/by/4.0/

lower provision coverage ratio which reflects the banks declining ability to cover its bad loans.

Table 5: Correlation between Gross NPA and Capital adequacy Ratio of Axis Bank (2019-2024):

Year	Gross NPA (%)	CAR (%)
2019-2020	4.86	17.53
2020-2021	3.7	19.12
2021-2022	2.82	18.54
2022-2023	2.02	17.64
2023-2024	1.43	16.63

Source: Axis Bank Annual Reports

Table 6: Correlation matrix between Gross NPA and CAR:

	Gross NPA (%)	*CAR (%)*
Gross NPA (%)	1	
CAR (%)	0.438222	1

Source: Calculated using MS Excel

Interpretation: The correlation coefficient between gross NPA and CAR is 0.438222, indicates a moderate positive correlation. This suggests that the gross NPA increases the CAR also tends to increase some extent. This may suggest that the bank increases its capital adequacy in response to rise NPAs as a safeguard to maintain financial stability and regulatory compliance.

Standard Deviation: Standard deviation is a statistical tool used to measure the extent of variation or dispersion in a dataset. In this study, it helps to understand how consistently Axis Bank managed its non-performing assets over the years. These values help assess the effectiveness of credit risk monitoring and highlight the need for sustained efforts to maintain asset quality.

Table 7: Year-wise Standard deviation of Gross NPA (%):

Year	Gross NPA (%)
2019-2020	4.86
2020-2021	3.7
2021-2022	2.82
2022-2023	2.02
2023-2024	1.43

Source: Axis Bank Annual Reports

Interpretation: The standard deviation of Gross NPA values for Axis Bank over the period from 2019 to 2024 is 1.2167. This value represents the degree of variation. A standard deviation of 1.21 indicates a moderate level of variability in gross NPA performance. Overall the banks performance in managing net NPAs has shown positive consistency and the reduction in variability over time indicates stronger credit risk governance.

Table 8: Year-wise Standard deviation of Net NPA (%):

Year	Net NPA (%)
2019-2020	1.56
2020-2021	1.05
2021-2022	0.7
2022-2023	0.39
2023-2024	0.31

Source: Axis Bank Annual Reports

Interpretation: The standard deviation of Net NPA values for year 2019 to 2024 is calculated to be 0.4600. This lower value indicates that the net NPA ratio has shown minimal fluctuation over the years. It shows that the Axis Banks credit appraisal systems, post disbursement monitoring and recovery mechanisms are functioning effectively and consistently.

ANOVA: ANOVA was used in this study to examine whether there were any significant differences in NPA levels across different quarters over a five Year period. A P- value greater than 0.05 indicates that the variations in quarterly NPA values are not statistically significant, meaning there is no major quarterly impact on the NPA trend

ANOVA Test on Quarterly Gross NPA Data:

Hypothesis:

Ho (null hypothesis): There is no significant difference in Gross NPA means across quarters

H1 (Alternative hypothesis): There is a significant difference in Gross NPA means across quarters

Table 9: Quarterly Gross NPA (%) of Axis Bank (2019-2024)

Year	Q1	Q2	Q3	Q4
2019-2020	5.25	5.03	5	4.86
2020-2021	4.72	4.28	3.44	3.7
2021-2022	3.85	3.53	3.17	2.82
2022-2023	2.76	2.5	2.38	2.02
2023-2024	1.96	1.73	1.58	1.43

©2025 The Author(s). Published by Infogain Publication, This work is licensed under a Creative Commons Attribution 4.0 License. http://creativecommons.org/licenses/by/4.0/

Source: Compiled from Axis Bank Quarterly Reports (2019-2024)

Table 10: ANOVA Summary for Quarterly Gross NPA (%):

ANOVA: Single Factor						
Summary						
Groups	Count	Sum	Average	Variance		
Q1	5	18.54	3.708	1.84407		
Q2	5	17.07	3.414	1.76153		
Q3	5	15.57	3.114	1.63958		
Q4	5	14.83	2.966	1.85038		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1.628055	3	0.542685	0.305929	0.8207232	3.23887152
Within Groups	28.38224	16	1.77389			
Total	30.0103	19				

Source: Calculated using MS Excel

Interpretation: The obtained P-value is 0.8207, which is greater than 0.05. This indicates that the differences in quarterly Gross NPA values are not statistically significant. In simple terms, this means that Gross NPA levels have remained relatively stable across quarters, and any variations observed are due to chance rather than actual differences between quarters. This suggests that Axis Bank's credit risk management practices have likely contributed to consistent performance in NPA control throughout the year, rather than being affected by seasonal or quarterly fluctuations.

ANOVA for Quarterly Net NPA Data:

Hypothesis:

Ho (null hypothesis): there is no significant difference in Net NPA means across quarters

H1 (Alternative hypothesis): there is a significant difference in Net NPA means across quarters

Table 11: Quarterly Net NPA (%) of Axis Bank (2019-2024):

YEARS	**Q1**	**Q2**	**Q3**	**Q4**
2019-2020	2.04	1.99	2.09	1.56
2020-2021	1.23	1.03	0.74	1.05
2021-2022	1.2	1.08	0.91	0.73
2022-2023	0.64	0.51	0.47	0.39
2023-2024	0.41	0.36	0.36	0.31

Source: Compiled from Axis Bank Quarterly Reports (2019-2024)

Table 12: ANOVA Summary for Quarterly Net NPA (%):

ANOVA: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Q1	5	5.52	1.104	0.39953		
Q2	5	4.97	0.994	0.40923		
Q3	5	4.57	0.914	0.47933		
Q4	5	4.04	0.808	0.26322		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.23506	3	0.078353	0.202031	0.893459	3.238872
Within Groups	6.20524	16	0.387828			

©2025 The Author(s). Published by Infogain Publication, This work is licensed under a Creative Commons Attribution 4.0 License. http://creativecommons.org/licenses/by/4.0/

Total	6.4403	19				

Interpretation: The result shows a P-value of 0.8934, which is greater than 0.05, and the F-v alue (0.2003) is also less than the F-critical value (3.2389). This means the differences in Net NPA values across quarters are not statistically significant. The variations are likely due to random fluctuations, not structural or policy changes. Hence, it can be interpreted that Axis Bank maintained consistent Net NPA performance across all quarters, indicating strong control over asset quality throughout the year.

Findings:

- Gross non-performing assets (NPA) of Axis Bank declined significantly from 4.86% in 2019–20 to 1.43% in 2023–24, indicating stronger credit screening and recovery efforts.
- Net NPAs also showed a notable reduction from 1.56% to 0.31% during the same period, reflecting improved asset quality and effective post-disbursement monitoring.
- The Provision Coverage Ratio (PCR) increased from 69% to 79%, suggesting that the bank has adopted a more conservative and proactive approach toward provisioning for potential credit losses.
- Capital Adequacy Ratio (CAR) remained consistently above the regulatory requirement of 11.5%, ranging between 16.63% and 19.12%, which highlights the bank's strong capital position and ability to absorb financial shocks.
- The correlation coefficient between Gross NPA and PCR was calculated as -0.948, indicating a strong inverse relationship, where higher provisioning was associated with lower levels of NPAs.
- The correlation between Gross NPA and CAR was moderately positive at 0.438, suggesting that while higher capital provides stability, it does not directly influence NPA reduction.
- The ANOVA test results indicated no significant differences in NPA values across different quarters, suggesting that the bank has maintained consistent performance in credit risk management throughout the period.
- Standard deviation analysis showed moderate variability in Gross NPAs over the years, while Net NPAs exhibited even lower fluctuation, reflecting a stable and controlled credit risk environment.
- The application of internal rating models, early warning systems, and risk-based pricing played a crucial role in identifying high-risk accounts before they turned into defaults.
- Technological tools such as real-time credit dashboards, AI-based monitoring, and borrower behavior tracking helped the bank strengthen its early detection and decision-making processes.

Suggestions:

- **1. Strengthen Credit Appraisal for MSMEs and Retail Loans** Axis Bank should enhance its borrower evaluation process, especially for MSME and unsecured retail loans, by incorporating cash flow-based assessments and alternative credit scoring models to reduce default risk.
- **2. Integrate Alternative Data into Risk Assessment** To improve borrower profiling and predictive credit risk analysis, the bank should use non-traditional data sources such as GST returns, electricity bills, and transaction behavior patterns.
- **3. Improve Recovery and Resolution Mechanisms** The bank must streamline its recovery processes by reinforcing dedicated legal teams and leveraging fast-track options under DRT, SARFAESI, and IBC frameworks to reduce delays and increase recovery efficiency.
- **4. Upgrade Staff Training and Risk Culture** Regular training programs on emerging credit risks, RBI regulations, and fraud detection techniques should be provided to credit and risk management teams to ensure updated practices and stronger risk culture.
- **5. Adopt Advanced Technology for Risk Monitoring** Artificial intelligence and

©2025 The Author(s). Published by Infogain Publication, This work is licensed under a Creative Commons Attribution 4.0 License. http://creativecommons.org/licenses/by/4.0/

machine learning tools should be widely adopted for real-time monitoring of borrower behavior, automated early warning signals, and dynamic risk scoring.

- **6. Enhance Post-Disbursement Monitoring** A structured mechanism should be developed to track loan utilization and repayment trends soon after disbursement, particularly during the initial 12 months when risk of default is higher.
- **7. Introduce Incentive-Based Risk Management** Branches and credit teams that consistently maintain low NPA ratios should be rewarded to encourage a performance-driven approach to risk control and portfolio quality.
- **8. Monitor Sectorial Exposure Limits** The bank should actively manage its exposure to high-risk sectors like real estate, infrastructure, and textiles by enforcing prudent internal limits and conducting regular sector stress testing.
- **9. Conduct Frequent Internal Risk Audits** More frequent, data-backed internal audits should be implemented to identify lapses in credit sanctioning, documentation, and monitoring phases, allowing for timely corrective measures.
- **10. Promote Financial Literacy Among Borrowers** Axis Bank should organize financial awareness sessions and onboarding education to help borrowers understand loan terms, repayment schedules, and the importance of credit discipline.

V. CONCLUSION

In the dynamic landscape of Indian banking, credit risk continues to be a critical area that impacts both profitability and long-term sustainability. The ability to effectively manage credit exposure determines how well a bank can withstand economic uncertainties and regulatory challenges. This study analysed the performance of Axis Bank over a five-year period, revealing a steady reduction in both Gross and Net NPAs. The evidence suggests that the bank's internal credit risk framework—including its rating models, early warning signals, and provisioning policies—has been instrumental in maintaining asset quality. The results from tools like trend analysis, correlation, standard deviation, and ANOVA further validate the consistency and strength of Axis Bank's credit management practices. While the outcomes are encouraging, the study also identifies areas where the bank can grow further, such as improving MSME loan monitoring, integrating real-time analytics, and enhancing recovery mechanisms. In conclusion, Axis Bank demonstrates how a robust credit risk management framework can reduce NPA levels and contribute to stronger financial performance, ultimately supporting stability in the wider banking sector.

REFERENCES

[1] Pandey, I.M. (2018). Financial Management. Vikas Publishing House.
[2] Bhole, L.M. & Mahakud, J. (2017). Financial Institutions and Markets. Tata McGraw-Hill.
[3] Khan, M.Y. & Jain, P.K. (2014). Financial Management: Text, Problems and Cases. McGraw-Hill Education.
[4] Kapoor, A. (2021). "Credit Risk Management in Indian Banks." International Journal of Finance and Banking Research.
[5] Usha, S. (2022). "Non-Performing Assets in India: A Sectoral Analysis." Journal of Financial Studies.
[6] Reddy, P.S. (2020). "A Study on NPA Trends in Indian Banking." Indian Journal of Economics and Banking.

©2025 The Author(s). Published by Infogain Publication, This work is licensed under a Creative Commons Attribution 4.0 License. http://creativecommons.org/licenses/by/4.0/