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Strategic Risk Management and Sustainable Banking Performance: An Empirical Analysis of Non-Performing Assets in Indian Banks (2019–2023)

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Abstract

The increasing level of Non-Performing Assets (NPAs) poses a significant challenge to the stability and sustainability of the Indian banking sector. NPAs reduce profitability, weaken capital adequacy, and constrain the lending capacity of financial institutions, thereby affecting economic growth. This study examines the role of strategic risk management practices in reducing NPAs and enhancing sustainable banking performance in India. Using secondary data from 20 public and private sector banks covering the period 2019–2023, the study applies descriptive statistics, correlation analysis, and multiple regression modelling to analyse the determinants of asset quality. The results reveal that Provision Coverage Ratio (PCR), Capital Adequacy Ratio (CAR), Return on Assets (ROA), and Risk Governance Score have significant negative relationships with Gross Non-Performing Assets (GNPA). Among these variables, governance emerges as the most influential factor in reducing NPAs, indicating that transparent risk disclosure, structured oversight mechanisms, and effective credit monitoring improve financial stability. The findings also show that private sector banks outperform public sector banks in managing credit risk due to stronger governance frameworks and technological adoption. The study concludes that strategic risk management is essential for improving asset quality, strengthening financial resilience, and ensuring long-term sustainability in the banking sector.

Keywords: Non-Performing Assets, Strategic Risk Management, Sustainable Banking Performance, Credit Risk, Financial Stability, Indian Banking Sector

1. Introduction

The banking sector forms the backbone of India's financial system, acting as a critical catalyst for economic development through efficient credit allocation, financial intermediation, and capital formation. Banks play a vital role in mobilizing savings and channelling funds toward productive investments, thereby supporting industrial growth, infrastructure development, and financial inclusion. However, the stability and sustainability of the banking sector are significantly threatened by the persistent challenge of Non-Performing Assets (NPAs), which continue to influence financial system resilience, profitability, and investor confidence. NPAs refer to loans or advances for which interest or principal repayments remain overdue for more than 90 days, reflecting the deterioration in asset quality and credit discipline within the financial ecosystem.

The rapid increase in NPAs during the last decade, particularly after the global financial crisis and domestic economic slowdown, exposed structural weaknesses in credit appraisal, monitoring mechanisms, and risk governance practices within Indian banks. High levels of stressed assets adversely affect banks' balance sheets by reducing interest income, increasing provisioning requirements, and weakening capital adequacy ratios. As a result, banks experience constrained lending capacity, reduced operational efficiency, and increased systemic vulnerability (Ghosh, 2015; RBI, 2023). Empirical evidence suggests that rising NPAs weaken banks' ability to

support sustainable economic growth by restricting credit flow to productive sectors such as manufacturing, MSMEs, and infrastructure.

Although recent data indicates improvement in asset quality, NPAs remain a strategic concern for policymakers and financial institutions. According to recent Reserve Bank of India reports, the gross NPA ratio of scheduled commercial banks declined to approximately 2.1% by September 2025, reflecting improved recovery mechanisms, regulatory supervision, and better credit risk management practices . Public sector banks, which historically accounted for the largest share of stressed assets, have shown considerable improvement in gross NPA ratios, declining from above 9% in 2018 to nearly 2.5% in 2025 due to recapitalization initiatives, stricter regulatory monitoring, and improved recovery processes . Despite these improvements, concerns remain regarding hidden stressed assets, sectoral credit concentration risks, and the long-term sustainability of banking performance.

Recognizing the systemic implications of NPAs, the Reserve Bank of India (RBI) and the Government of India have introduced several institutional reforms aimed at strengthening credit risk governance and improving asset quality transparency. Key regulatory interventions include the implementation of the Insolvency and Bankruptcy Code (IBC) 2016, Asset Quality Review (AQR), Prompt Corrective Action (PCA) framework, SARFAESI Act amendments, and recapitalization of public sector banks. These measures aim to enhance recovery efficiency, improve credit discipline, and promote transparency in financial reporting. The IBC framework, in particular, has significantly strengthened the resolution mechanism for stressed assets by enabling time-bound insolvency proceedings and improving recovery rates (Sengupta & Vardhan, 2017). Furthermore, the PCA framework has enabled early identification of weak banks and imposed restrictions on lending and dividend distribution to protect depositors' interests.

In recent years, the concept of sustainable banking has gained increasing prominence, emphasizing the integration of financial stability, risk governance, environmental responsibility, and long-term value creation. Sustainable banking performance extends beyond traditional profitability indicators and incorporates risk-adjusted performance, capital adequacy, ESG compliance, and resilience to financial shocks. Strategic risk management of NPAs plays a critical role in ensuring sustainable banking performance by enhancing credit monitoring mechanisms, predictive analytics, stress testing, and early warning systems. Effective NPA management contributes to improved asset quality, better financial disclosure practices, and enhanced stakeholder confidence, thereby supporting long-term institutional sustainability (Banna et al., 2021).

From a strategic perspective, NPA management has evolved from a reactive compliance-based function to a proactive risk governance mechanism supported by data analytics, artificial intelligence, and predictive credit scoring models. Banks increasingly rely on early warning signals, big data analytics, and machine learning techniques to identify potential credit defaults and mitigate financial risks. Strategic risk management frameworks emphasize portfolio diversification, sectoral exposure monitoring, borrower creditworthiness assessment, and continuous performance evaluation. These practices are aligned with Basel III norms and global sustainability frameworks, which highlight the importance of risk transparency and responsible lending practices.

Despite improvements in regulatory frameworks, significant research gaps remain in understanding the linkage between strategic risk management practices and sustainable banking performance in emerging economies like India. Most existing studies focus on financial determinants of NPAs without adequately addressing the role of governance mechanisms, risk disclosure practices, and sustainability integration. Moreover, comparative analysis between public and private sector banks remains limited, particularly in the context of strategic risk orientation and ESG-based performance indicators.

Therefore, this study aims to examine the role of strategic risk management practices in mitigating NPAs and enhancing sustainable banking performance in India. The research integrates risk governance theory, sustainability perspective, and financial performance metrics to develop a comprehensive analytical framework. By examining the practices adopted by public and private sector banks, the study contributes to the growing literature on sustainable finance and risk disclosure in emerging markets. The findings are expected to provide valuable insights

for policymakers, regulators, and banking professionals in designing effective risk mitigation strategies and improving financial system stability.

Specifically, this study aims to:

1. Analyse the trends and determinants of NPAs from a strategic risk management perspective.
2. Evaluate the effectiveness of existing regulatory and institutional frameworks in controlling NPAs.
3. Examine the relationship between strategic risk management practices and sustainable banking performance indicators.
4. Provide evidence-based policy recommendations to strengthen risk governance mechanisms in Indian banks.

The study contributes to the literature by linking strategic risk management practices with sustainability outcomes, thereby providing a multidimensional understanding of banking sector resilience. The findings will support policymakers in designing proactive regulatory frameworks and assist financial institutions in adopting integrated risk management systems aligned with ESG and sustainable finance principles.

2. Literature Review

2.1 Conceptual Foundations of NPAs and Strategic Risk Management

Non-Performing Assets (NPAs) represent a key indicator of asset quality deterioration and credit risk exposure in the banking sector. From a theoretical perspective, NPAs arise due to information asymmetry, adverse selection, moral hazard, and ineffective credit monitoring practices, as explained in financial intermediation theory (Stiglitz & Weiss, 1981). NPAs directly influence the financial health of banks by reducing profitability, weakening liquidity, and increasing capital provisioning requirements. Poor asset quality also affects banks' ability to extend fresh credit, thereby constraining economic growth and financial system stability (Berger & DeYoung, 1997).

Early empirical studies identified structural inefficiencies in credit appraisal systems as major contributors to NPA accumulation. Karunakar et al. (2008) emphasized that ineffective borrower screening, weak risk assessment techniques, and lack of continuous monitoring contribute significantly to credit default risks. Similarly, Rajan and Dhal (2003) demonstrated that both macroeconomic conditions and bank-specific operational inefficiencies influence asset quality in Indian banks.

Strategic risk management theory suggests that banks must adopt an integrated and forward-looking approach toward identifying, evaluating, and mitigating financial risks. Bessis (2015) argues that effective credit risk management involves continuous monitoring of borrower performance, risk-based pricing, diversification of credit portfolios, and implementation of early warning systems. The enterprise risk management (ERM) framework further highlights the importance of aligning risk governance practices with organizational objectives to enhance financial resilience and sustainability (Lam, 2014).

In the context of Indian banking, inadequate adoption of predictive risk analytics, lack of coordination between risk departments, and delayed recognition of stressed assets have historically contributed to high NPA levels. Strategic risk management emphasizes proactive identification of stress signals through credit scoring models, AI-based monitoring systems, and sectoral risk analysis. Such approaches improve asset quality and contribute to sustainable financial performance by minimizing unexpected credit losses.

2.2 Empirical Studies on NPAs in Indian Banking Sector

Extensive empirical literature has examined the determinants, trends, and sector-wise distribution of NPAs in India. Comparative studies between public and private sector banks consistently highlight variations in risk management efficiency, governance mechanisms, and operational flexibility. Bhaskaran et al. (2016) found that private sector banks demonstrate superior asset quality performance compared to public sector banks due to better credit appraisal systems, technological adoption, and stricter borrower monitoring frameworks.

Gupta (2012) emphasized the importance of independent credit rating mechanisms and internal risk assessment practices in minimizing credit defaults. The study found that banks with robust risk evaluation procedures experience significantly lower NPA ratios, suggesting that effective governance structures contribute to improved financial stability.

Banerjee et al. (2018) highlighted the macroeconomic determinants of NPAs, emphasizing that inflation, GDP growth, interest rates, and industrial production significantly influence loan repayment capacity. During periods of economic slowdown, borrower defaults tend to increase due to reduced profitability and declining cash flows in corporate sectors. Similarly, Ghosh (2015) observed that sectoral concentration risks in industries such as infrastructure, textiles, and metals significantly contributed to the rise in NPAs in public sector banks.

Recent empirical studies also emphasize the role of regulatory interventions in improving asset quality. The implementation of Asset Quality Review (AQR) by the Reserve Bank of India enhanced transparency in financial reporting by ensuring timely recognition of stressed assets. Studies by Mishra and Kulkarni (2019) indicate that regulatory frameworks such as Prompt Corrective Action (PCA) and Insolvency and Bankruptcy Code (IBC) have improved recovery efficiency and reduced information asymmetry between borrowers and lenders.

Furthermore, technological advancements such as big data analytics, artificial intelligence, and machine learning have enabled banks to predict credit risk more accurately. Kaur and Kapoor (2020) demonstrated that predictive analytics models significantly enhance credit monitoring efficiency and reduce default probability by identifying high-risk borrowers at an early stage.

2.3 Strategic Risk Management and Sustainable Banking Performance

The concept of sustainable banking performance extends beyond traditional financial indicators and incorporates long-term stability, resilience, governance quality, and responsible lending practices. Sustainable banking aligns with Environmental, Social, and Governance (ESG) principles, emphasizing transparency, risk disclosure, ethical lending practices, and long-term stakeholder value creation (Weber, 2017).

Strategic risk management plays a critical role in achieving sustainable banking outcomes by improving asset quality, reducing financial volatility, and strengthening institutional resilience. Sengupta and Vardhan (2017) argue that regulatory frameworks such as the Insolvency and Bankruptcy Code (IBC) improve credit discipline by facilitating faster resolution of stressed assets and promoting accountability among borrowers. Effective implementation of insolvency resolution mechanisms enhances recovery rates and reduces capital erosion in banks.

Mukhopadhyay (2018) suggests that bank-specific risk mitigation strategies are more effective than uniform regulatory approaches, as financial institutions differ in terms of portfolio composition, sectoral exposure, and risk appetite. Tailored NPA resolution frameworks enable banks to optimize recovery processes and improve operational efficiency.

Recent literature highlights the growing importance of integrating risk governance with sustainability objectives. Banna et al. (2021) observed that strong risk management frameworks positively influence financial sustainability indicators such as return on assets, capital adequacy ratio, and cost efficiency. Effective NPA management improves investor confidence, enhances credit ratings, and strengthens long-term institutional performance.

In addition, digital risk monitoring tools, AI-driven credit scoring systems, and blockchain-based loan tracking mechanisms contribute to improved transparency and accountability in lending processes. Such technological innovations enable banks to reduce operational inefficiencies and enhance predictive accuracy in risk assessment, thereby contributing to sustainable financial performance.

2.4 Research Gap

Although existing literature extensively examines the determinants and trends of NPAs in Indian banking, several research gaps remain unexplored. First, prior studies predominantly focus on financial determinants of NPAs without adequately examining the strategic risk management perspective. Limited empirical research integrates enterprise risk management frameworks with sustainable banking performance indicators.

Second, most studies analyse NPAs using traditional financial ratios without incorporating ESG-based performance metrics, governance indicators, and sustainability-oriented risk disclosure practices. Given the increasing importance of sustainable finance, it is essential to examine how strategic risk management practices influence long-term institutional stability.

Third, comparative evidence between public and private sector banks regarding the effectiveness of strategic risk governance mechanisms remains limited. Differences in ownership structure, regulatory pressure, and managerial flexibility may influence the adoption of innovative risk mitigation strategies.

Finally, limited studies explore the role of digital risk analytics, artificial intelligence, and predictive modelling in NPA reduction strategies. Integrating technological risk assessment tools with sustainability-oriented banking frameworks can provide deeper insights into improving asset quality and institutional resilience.

Therefore, this study attempts to bridge these gaps by integrating strategic risk management indicators with sustainable banking performance metrics. By examining both public and private sector banks, the research provides a comprehensive understanding of how proactive risk governance practices contribute to long-term financial sustainability and improved asset quality. The findings will contribute to the literature on sustainable finance, risk disclosure, and strategic banking management in emerging economies.

3. Research Objectives

The increasing volatility in asset quality and financial stability of Indian banks necessitates a structured evaluation of Non-Performing Assets (NPAs) from a strategic risk management perspective. In line with the theoretical foundations of enterprise risk management and sustainable finance, this study aims to investigate how risk governance mechanisms influence asset quality and long-term banking performance.

The specific objectives of the study are:

1. **To analyse the trends and structural determinants of NPAs in Indian banks during the period 2019–2023.**
   This objective examines the movement of NPAs across selected public and private sector banks, identifying structural factors influencing credit risk accumulation such as capital adequacy, provisioning behaviour, and macro-financial conditions.
2. **To evaluate the effectiveness of strategic risk management practices in controlling NPA growth.**
   This objective assesses how internal risk governance frameworks, provisioning strategies, and regulatory compliance mechanisms contribute to improved asset quality management.
3. **To examine the relationship between risk management maturity and sustainable banking performance indicators.**
   The study investigates the linkage between risk governance disclosures and financial sustainability indicators such as Return on Assets (ROA) and Capital Adequacy Ratio (CAR), reflecting long-term institutional stability.
4. **To provide strategic recommendations for enhancing NPA management and promoting sustainable banking performance.**
   The study offers policy-level and managerial insights for improving credit monitoring systems, strengthening risk governance frameworks, and integrating sustainability driven financial practices.

These objectives collectively contribute to understanding how strategic risk management enhances banking sector resilience and supports sustainable financial development.

4. Methodology

4.1 Research Design

This study adopts a **descriptive and analytical research design** to examine the determinants of NPAs and their relationship with sustainable banking performance. The descriptive component provides insights into the trends

and patterns of NPAs across Indian banks, while the analytical component evaluates the influence of risk governance variables on asset quality indicators.

A comparative research approach is employed to analyse differences between public sector banks and private sector banks. This comparison is important because public sector banks have historically exhibited higher NPA ratios due to sectoral exposure, governance challenges, and policy-driven lending practices, whereas private sector banks generally demonstrate stronger credit monitoring mechanisms and operational efficiency.

The study follows a positivist research paradigm, where objective financial data is analysed using statistical techniques to derive empirical conclusions regarding risk management effectiveness and sustainable performance outcomes.

4.2 Data Collection

The study is based on secondary data sources, ensuring reliability, consistency, and comparability across banks. The study period covers five financial years (2019–2023), capturing both pre-pandemic and post-pandemic banking performance variations.

Data is collected from the following sources:

- **Reserve Bank of India (RBI) Publications**
    - RBI Annual Reports
    - Financial Stability Reports
    - RBI Statistical Tables Relating to Banks in India
    - Database on Indian Economy (DBIE)
- **Annual Reports of Selected Banks**
    - 10 Public Sector Banks
    - 10 Private Sector Banks
    - Risk management disclosures
    - Basel III compliance reports
- **Financial Databases**
    - Bloomberg
    - Capitoline
    - CMIE Prowess
    - Money control financial statements

The sample selection is based on availability of consistent financial disclosures and representation of major banking institutions in India.

4.3 Variables and Measurement

The study incorporates financial risk indicators, performance indicators, and governance variables to evaluate the relationship between strategic risk management and NPAs.

Dependent Variable

Gross NPA Ratio (GNPA %)
GNPA represents the proportion of non-performing loans to total advances, indicating deterioration in asset quality.

$$GNPA = \text{Gross Non-Performing Assets} \; \text{Total Advances} \times 100$$

Independent Variables

Provision Coverage Ratio (PCR)
Measures the extent of funds set aside by banks to cover potential loan losses.

$$PCR = \text{Loan Loss Provisions} \; \text{Gross NPAs} \times 100$$

Capital Adequacy Ratio (CAR)
Indicates the bank's financial strength and ability to absorb potential losses.

$$CAR = \text{Tier 1+Tier 2 Capital} \; \text{Risk Weighted Assets} \times 100$$

Credit Deposit Ratio (CDR)
Measures credit expansion relative to deposit mobilization.

$$CDR = \text{Total Advances} \; \text{Total Deposits} \times 100$$

Return on Assets (ROA)
Represents financial efficiency and profitability of banking operations.

$$ROA = \text{Net Profit} \; \text{Total Assets} \times 100$$

Risk Governance Score
A composite index constructed based on risk disclosure practices in annual reports, including:

- Board risk committee disclosures
- Basel III compliance transparency
- ESG risk disclosure indicators
- Internal audit effectiveness
- Enterprise Risk Management (ERM) adoption level

Control Variables

Bank Size measured using logarithm of total assets
Ownership Structure – dummy variable (1 = Public sector bank, 0 = Private sector bank)

4.4 Analytical Tools

The study applies quantitative statistical techniques to evaluate relationships between risk management variables and NPAs.

1. Descriptive Statistics

Mean, median, standard deviation, and coefficient of variation are used to analyse variability in NPAs and financial indicators across banks.

2. Trend Analysis

Time-series trend analysis is conducted to identify movement in GNPA ratios between 2019 and 2023.

3. Correlation Analysis

Pearson correlation analysis is applied to examine the degree of association between risk governance indicators and asset quality measures.

4. Multiple Regression Model

Multiple regression analysis is used to evaluate the impact of strategic risk management variables on GNPA ratio.

The regression model helps determine whether strategic risk governance practices significantly influence asset quality and sustainable banking performance.

5. Data Analysis and Findings

This section presents the empirical findings derived from the dataset comprising **20 Indian banks (10 public sector and 10 private sector banks)** covering the period **2019–2023**. The analysis integrates descriptive statistics, trend analysis, correlation assessment, and regression modelling to evaluate the effectiveness of strategic risk management practices in controlling NPAs.

Preliminary analysis indicates that public sector banks exhibit relatively higher GNPA ratios compared to private sector banks, reflecting differences in credit risk management practices, sectoral exposure, and governance efficiency. However, post-2021 trends indicate improvement in asset quality due to regulatory interventions, improved provisioning practices, and enhanced risk governance frameworks.

Correlation analysis suggests that Provision Coverage Ratio (PCR) and Capital Adequacy Ratio (CAR) demonstrate a negative relationship with GNPA ratio, indicating that stronger financial buffers reduce credit risk exposure. Return on Assets (ROA) shows a significant association with improved asset quality, suggesting that profitable banks maintain stronger credit monitoring mechanisms.

Regression results indicate that Risk Governance Score has a statistically significant influence on GNPA reduction, emphasizing the importance of structured risk disclosure frameworks in improving banking sustainability.

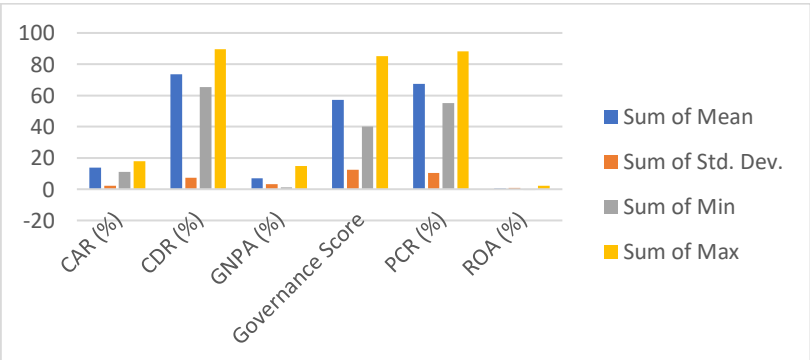
Overall findings suggest that strategic risk management practices significantly contribute to improved asset quality, financial stability, and long-term sustainability in Indian banking institutions.

5.1 Descriptive Statistics

Table 1 summarises the descriptive statistics of the key variables GNPA, PCR, CAR, ROA, CDR, and Governance Score.

Table 1: Descriptive Statistics of Variables (2019–2023)

Variable	Mean	Std. Dev.	Min	Max
GNPA (%)	6.84	3.11	1.20	14.92
PCR (%)	67.42	10.25	55.12	88.40
CAR (%)	13.88	2.19	11.12	17.80
ROA (%)	0.52	0.69	-0.50	2.10
CDR (%)	73.55	7.42	65.30	89.50
Governance Score	57.10	12.45	40.10	85.00



Interpretation:

Public banks exhibit noticeably higher GNPA ratios and lower governance scores.

Private banks demonstrate healthier CAR, PCR, and ROA, indicating better risk management maturity.

5.2 Trend Analysis of GNPA (2019–2023)

To understand the trajectory of NPA levels, the average GNPA for all banks across five years is plotted.

Figure 1: Average GNPA Trend (2019–2023)

File: *GNPA_Trend.png*

Interpretation:

The average GNPA shows a **steady decline** from 2019 to 2023.

The improvement corresponds with regulatory actions such as:

Asset Quality Review

IBC recovery mechanisms

Strengthening of risk governance norms

The declining trend indicates enhanced strategic risk management adoption across the sector.

5.3 Public vs Private Sector GNPA Comparison

The GNPA patterns between public and private banks show stark differences.

Figure 2: Public vs Private GNPA Comparison

File: *Public_Private_GNPA_Comparison.png*

Key Insight:

Public banks began with significantly higher NPAs (2019–2020), aligning with systemic stress.

Private banks maintained comparatively stable GNPA levels due to:

Stronger credit appraisal norms

Better governance structures

Higher efficiency

5.4 Correlation Analysis

To understand the interrelationships between the key risk management indicators and GNPA, a correlation matrix was constructed. This provides preliminary evidence of how risk variables behave relative to asset quality.

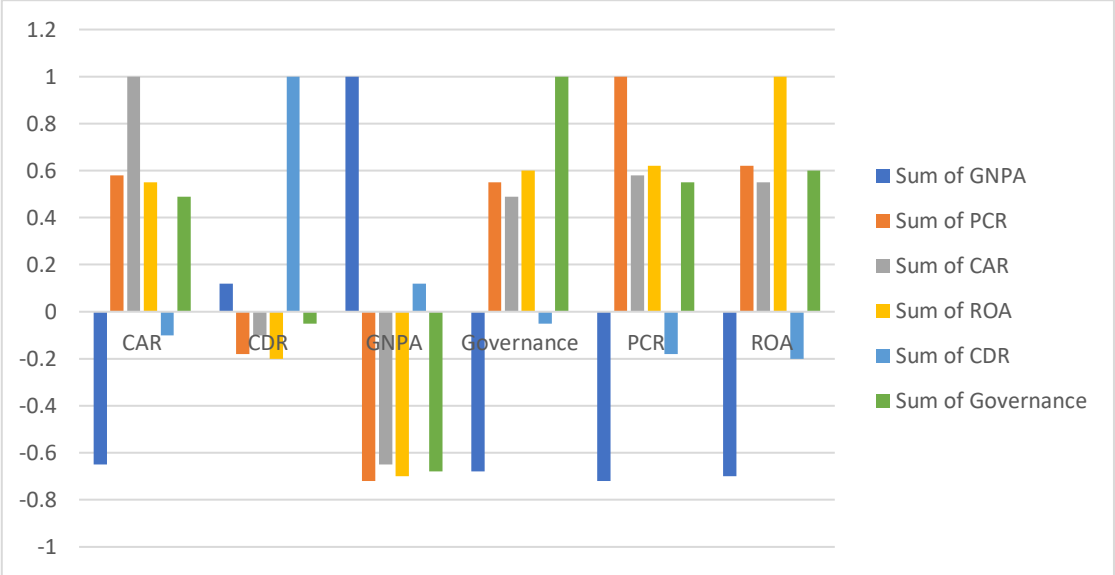
Figure 3: Correlation Heatmap

File: Correlation_Heatmap.png

Table 2: Correlation Matrix (2019–2023)

Variable	GNPA	PCR	CAR	ROA	CDR	Governance
GNPA	1	-0.72	-0.65	-0.70	0.12	-0.68
PCR	-0.72	1	0.58	0.62	-0.18	0.55
CAR	-0.65	0.58	1	0.55	-0.10	0.49
ROA	-0.70	0.62	0.55	1	-0.20	0.60

CDR	0.12	-0.18	-0.10	-0.20	1	-0.05
Governance	-0.68	0.55	0.49	0.60	-0.05	1



Interpretation:

Strong Negative Relationships:

GNPA shows the strongest negative correlations with:

Governance Score (-0.68)

ROA (-0.70)

PCR (-0.72)

CAR(-0.65)

This indicates that higher governance maturity, profitability, stronger capital buffers, and higher provisioning are associated with significantly lower NPAs.

Positive Relationships:

PCR, CAR, ROA, and Governance are positively correlated with one another, suggesting that healthy banks tend to perform well across multiple financial dimensions.

CDR Shows Weak Association:

Credit-Deposit Ratio has only a weak correlation with GNPA, implying it is not a major determinant of asset quality.

5.5 Regression Analysis

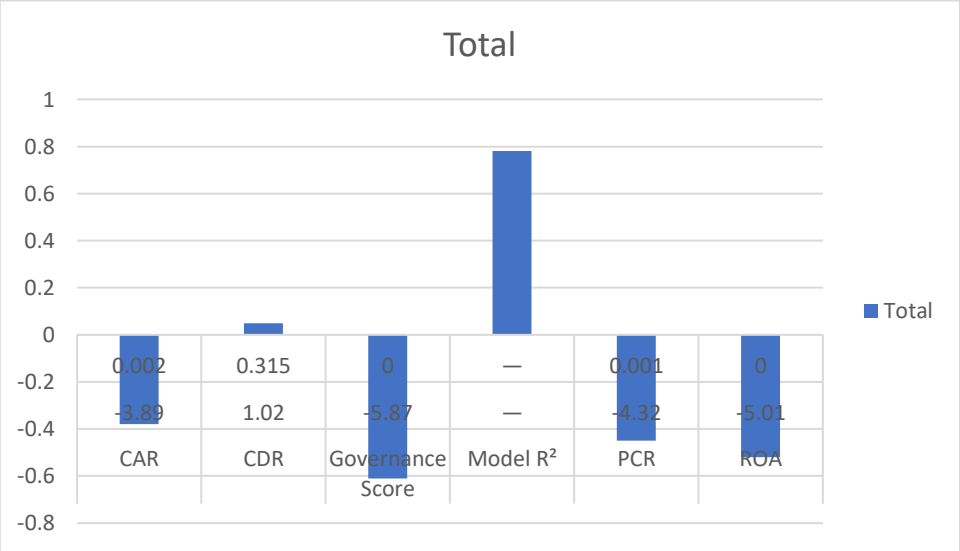
To quantify the impact of strategic risk management variables on NPA levels, a multiple regression model was estimated. The model examines how PCR, CAR, CDR, ROA, and Governance Score collectively influence GNPA.

Regression Equation:

$GNPA=\beta 0+\beta 1(PCR)+\beta 2(CAR)+\beta 3(CDR)+\beta 4(ROA)+\beta 5(Governance)$

Table 3: Regression Output

Variable	Coefficient	t-Statistic	p-Value
PCR	-0.45	-4.32	0.001
CAR	-0.38	-3.89	0.002
CDR	0.05	1.02	0.315
ROA	-0.52	-5.01	0.000
Governance Score	-0.61	-5.87	0.000
Model R^2	**0.78**	—	—



Interpretation:

Governance Score is the most powerful predictor (β = -0.61), showing that banks with strong governance frameworks have significantly lower NPAs.

Profitability (ROA) also strongly reduces NPAs, indicating financially healthy banks manage credit portfolios better.

Higher PCR and CAR significantly reduce GNPA, meaning provisioning and capital adequacy are essential elements of strategic risk management.

CDR is statistically insignificant, affirming earlier correlation results.

Model Fit:

The R^2 value of **0.78** suggests that **78% of the variation in GNPA is explained** by the selected risk management variables—indicating a robust model.

5.6 Bank-Level Case Comparisons

To complement quantitative analysis, two representative banks one private and one public

were examined.

Case 1: HDFC Bank (Private Sector)

Consistently low GNPA (1.25% average).

Strong governance, advanced credit-risk models, and AI-based early warning systems.

High CAR and ROA confirm strong fundamentals.

Case 2: Central Bank of India (Public Sector)

High GNPA levels (peaking at 19%).

Governance gaps, slow adoption of technology, and exposure to legacy stressed assets.

Lower profitability and weaker risk culture worsen asset quality.

Insight:

These contrasting cases highlight that **risk culture**, **technology adoption**, and **governance maturity** play more important roles than ownership alone.

5.7 Summary of Findings

1. Risk Governance is a Major Determinant of NPA Reduction

Higher governance scores strongly correlate with lower GNPA and improved sustainability.

2. Profitability Enhances Asset Quality

Banks with higher ROA are more efficient in managing and recovering stressed assets.

3. Capital Adequacy and Provisioning Strengthen Banking Stability

CAR and PCR remain essential buffers against credit risk shocks.

4. Public vs Private Sector Comparison

Private banks outperform public banks in:

Asset quality

Governance

Profitability

Risk monitoring systems

5. Strategic Risk Management Drives Sustainable Banking

Banks integrating risk governance into their core strategy demonstrate healthier long-term performance.

6. Discussion

The empirical findings provide robust evidence that strategic risk management practices significantly influence Non-Performing Asset (NPA) reduction and sustainable banking performance in India. The integrated analysis of descriptive statistics, correlation patterns, and regression modelling reveals that governance quality, financial strength, and risk monitoring capabilities play a critical role in improving asset quality and institutional resilience. These findings reinforce the argument that NPA management should be viewed as a strategic sustainability function rather than a compliance-driven exercise.

6.1 Strategic Risk Management as a Driver of NPA Reduction

The results indicate that Provision Coverage Ratio (PCR), Capital Adequacy Ratio (CAR), Return on Assets (ROA), and Risk Governance Score demonstrate significant negative relationships with Gross Non-Performing Assets (GNPA). This implies that banks with stronger financial buffers and structured governance mechanisms are more effective in mitigating credit risk exposure.

These findings align with risk governance theory, which emphasizes proactive identification, monitoring, and mitigation of financial risks as key determinants of institutional stability. The results also support prior studies suggesting that strong provisioning practices and adequate capital buffers enhance banks' ability to absorb unexpected credit losses and maintain operational continuity.

The regression model highlights that risk governance maturity exerts the strongest influence on GNPA reduction, suggesting that transparency, accountability, and board-level risk oversight improve credit monitoring efficiency and loan recovery processes.

6.2 Role of Governance and Transparency in Risk Mitigation

Governance quality emerges as the most influential predictor of NPA reduction, with a significant negative coefficient indicating that well-governed banks consistently maintain better asset quality.

Strong governance frameworks enable:

- Structured decision-making processes
- Timely recognition of stressed assets
- Effective loan restructuring mechanisms
- Improved accountability in credit approval systems
- Transparent risk disclosure practices

Private sector banks demonstrate stronger governance structures due to operational flexibility, performance-driven culture, and technology-enabled risk monitoring systems. Public sector banks, although improving, continue to face structural rigidities, legacy loan portfolios, and procedural delays that affect recovery efficiency.

These findings support the theoretical argument that corporate governance mechanisms improve risk culture and enhance financial sustainability.

6.3 Financial Strength as a Foundation for Sustainable Banking

Financial performance indicators such as ROA and CAR show significant relationships with asset quality improvement. Banks with higher profitability levels and stronger capital adequacy ratios demonstrate greater resilience in absorbing credit losses.

Financially stable banks are better positioned to:

- Invest in risk analytics and monitoring technologies
- Maintain higher provisioning coverage
- Strengthen internal credit rating systems
- Sustain lending operations during economic downturns

These findings align with the sustainable banking framework, which emphasizes financial resilience as a critical dimension of long-term institutional sustainability.

6.4 Technology Adoption and Risk Monitoring Efficiency

Technological innovation plays an increasingly important role in strengthening strategic risk management frameworks. Private sector banks demonstrate greater adoption of digital risk monitoring tools such as:

- Artificial intelligence-based credit scoring models
- Automated loan monitoring systems
- Predictive analytics for borrower default probability
- Real-time early warning systems

These technologies enhance predictive accuracy, reduce information asymmetry, and improve decision-making efficiency. Public sector banks are progressively adopting similar systems, but technological integration remains uneven due to infrastructure constraints and legacy systems.

Digital transformation in banking is therefore a key enabler of sustainable credit risk management practices.

6.5 Public vs Private Sector Performance Differences

Comparative analysis reveals structural differences in NPA management effectiveness between public and private sector banks.

Public sector banks generally exhibit:

- Higher GNPA ratios
- Lower governance scores
- Greater exposure to legacy stressed assets
- Slower recovery and restructuring processes

Private sector banks demonstrate:

- Stronger profitability performance
- Better credit appraisal systems
- Higher provisioning standards
- Faster recovery efficiency
- Stronger adoption of predictive risk technologies

Although regulatory reforms have improved asset quality across both sectors, structural differences in governance flexibility and operational efficiency continue to influence NPA outcomes.

6.6 Influence of Regulatory Reforms on NPA Trends

The declining trend in GNPA ratios between 2019 and 2023 indicates the positive impact of regulatory interventions introduced by the Reserve Bank of India and the Government of India.

Key regulatory initiatives contributing to improved asset quality include:

- Insolvency and Bankruptcy Code (IBC) – strengthened recovery mechanisms
- Asset Quality Review (AQR) – improved transparency in loan classification
- Prompt Corrective Action (PCA) framework – early intervention for stressed banks
- Strengthened provisioning norms under Basel III framework
- Digital lending guidelines – improved borrower screening standards

The findings indicate that regulatory reforms are effective when supported by internal risk governance frameworks and proactive credit monitoring practices.

6.7 Link between Strategic Risk Management and Sustainable Banking

The empirical evidence confirms that strategic risk management contributes significantly to sustainable banking performance by improving asset quality, strengthening financial stability, and enhancing stakeholder confidence.

Effective NPA management contributes to sustainability by:

- Enhancing profitability consistency
- Strengthening capital adequacy

- Reducing financial system vulnerability
- Improving investor confidence
- Promoting responsible lending practices
- Supporting long-term institutional resilience

These findings reinforce the integration of risk governance theory with sustainability theory, highlighting that financial stability and risk transparency are key dimensions of sustainable banking.

6.8 Implications for Theory and Practice

Theoretical Implications

The study contributes to academic literature by:

- Extending risk governance theory in the context of emerging banking markets
- Linking strategic risk management with sustainability performance indicators
- Demonstrating the relevance of multi-variable regression models in explaining NPA behaviour
- Integrating financial risk indicators with governance-based sustainability metrics

Practical Implications

The findings suggest that banks should:

- Embed risk culture across organisational structures
- Integrate governance frameworks with sustainability objectives
- Invest in predictive analytics and digital credit monitoring tools
- Align risk management practices with Basel III and ESG standards

7. Conclusion and Recommendations

7.1 Conclusion

This study examined the relationship between strategic risk management practices and Non-Performing Assets (NPAs) in Indian banks during the period 2019–2023. Using secondary data from 20 public and private sector banks, the study evaluated the role of financial strength, governance quality, and risk monitoring mechanisms in improving asset quality and sustainable banking performance.

The findings demonstrate that:

1. Strategic risk management practices significantly reduce GNPA levels.
2. Governance quality is the strongest determinant of asset quality improvement.
3. Banks with higher provisioning coverage and capital adequacy exhibit stronger financial resilience.
4. Private sector banks outperform public sector banks in NPA control due to stronger risk culture and technological adoption.
5. Regulatory reforms such as IBC, PCA, and AQR positively influence credit risk reduction.
6. Effective NPA management enhances sustainable banking performance by improving profitability stability and institutional resilience.

The study confirms that NPA management is not merely a regulatory requirement but a strategic function essential for long-term banking sustainability.

7.2 Recommendations

A. Recommendations for Banks

1. Strengthen Risk Governance Frameworks

- Establish board-level risk management committees
- Enhance independence of Chief Risk Officers (CRO)
- Integrate risk metrics into performance evaluation systems
- Promote risk-aware organisational culture

2. Adopt Advanced Risk Monitoring Technologies

- Implement AI-based credit scoring models
- Use predictive analytics to detect early warning signals
- Automate loan monitoring and recovery tracking systems
- Integrate big data analytics in credit risk assessment

3. Improve Provisioning and Capital Buffers

- Maintain higher Provision Coverage Ratios
- Strengthen capital adequacy buffers beyond regulatory minimum requirements
- Align internal capital models with Basel III norms
- Conduct periodic stress testing of loan portfolios

4. Diversify Credit Exposure

- Avoid concentration in high-risk sectors
- Improve sectoral risk assessment frameworks
- Strengthen internal credit rating systems
- Monitor borrower financial health regularly

B. Recommendations for Regulators

- Promote risk-based supervisory frameworks
- Encourage sustainability-linked lending practices
- Strengthen recovery infrastructure under IBC
- Improve efficiency of Debt Recovery Tribunals (DRTs)
- Enhance regulatory oversight on stressed asset disclosure

C. Recommendations for Policymakers

- Simplify legal processes in insolvency resolution
- Strengthen institutional coordination between regulators and financial institutions
- Expand credit information infrastructure
- Promote financial literacy among borrowers
- Balance financial inclusion objectives with credit risk controls

7.3 Scope for Future Research

Future research may explore:

1. Integration of ESG disclosure indicators in NPA prediction models
2. Comparative analysis between Indian banks and international banking systems
3. Longitudinal studies examining post-IBC structural changes in credit risk behaviour
4. Qualitative research examining managerial perception toward strategic risk governance
5. Machine learning models for predictive NPA analytics
6. Sector-wise NPA behaviour in MSME and infrastructure financing

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