



**Credit Risk Assessment in Commercial Banks: An Empirical Study of
Assessment Tools, Institutional Practices, and Determinants of Non-
Performing Assets**

¹Krishna Goswami, ²Sapna Rajurker, ³Dr. Sadaf Khan

Assistant Professor, School of Management, Faculty of Management and Commerce, SAM
Global University, Raisen, Madhya Pradesh, India¹

MBA (HR), School of Management, Faculty of Management and Commerce, SAM Global
University, Raisen, Madhya Pradesh, India²

Associate Professor, School of Management, Faculty of Management and Commerce, SAM
Global University, Raisen, Madhya Pradesh, India³

Abstract

Credit risk remains the single largest source of financial vulnerability for commercial banks, directly influencing profitability, capital adequacy, and systemic stability. This study examines the credit risk assessment practices adopted by commercial banks, with specific attention to the tools used to evaluate borrower creditworthiness, the institutional and regulatory factors shaping these practices, and the relationship between assessment rigor and the level of Non-Performing Assets (NPAs). The research is descriptive-cum-analytical in design and combines a review of secondary data on NPA trends across public sector, private sector, and foreign banks with an illustrative primary survey of bank credit officers regarding the relative importance they assign to different risk assessment tools, including credit scoring, financial ratio analysis, collateral valuation, internal credit rating, cash flow analysis, and sector-risk evaluation. Descriptive statistics, correlation analysis, and trend analysis were used to interpret the data. The findings indicate that banks employing a multi-parameter, technology-enabled credit appraisal framework report comparatively lower NPA ratios, that public sector banks continue to exhibit higher NPA levels than private and foreign banks despite regulatory convergence under Basel norms, and that qualitative judgment continues to play a significant role alongside quantitative scoring models. The study concludes that an integrated credit risk framework combining statistical models, sectoral analysis, and continuous post-sanction monitoring is essential to minimizing default risk. Practical recommendations are offered for strengthening early-warning systems, credit officer training, and risk-based pricing. The study contributes to the growing literature on bank risk management in emerging market economies and offers a methodological template for future empirical work.

Keywords: *Credit Risk Assessment; Commercial Banks; Non-Performing Assets (NPA); Basel Norms; Credit Rating; Risk Management; Loan Default*

I. INTRODUCTION

Commercial banks occupy a central position in the financial architecture of any economy, functioning as intermediaries that channel savings into productive investment through the

extension of credit. This intermediation function, while essential to economic growth, exposes banks to credit risk — the possibility that a borrower will fail to meet contractual obligations in full and on time. Credit risk is widely regarded as the most significant category of risk faced by banking institutions, typically accounting for the largest share of regulatory capital requirements under the Basel framework. The 2008 global financial crisis, and subsequent regional banking stress episodes, demonstrated with particular force that inadequate credit risk assessment can transmit shocks well beyond individual institutions, threatening systemic financial stability.

In the Indian context, the problem of rising Non-Performing Assets (NPAs) in the decade following the global financial crisis brought renewed attention to the adequacy of credit appraisal systems within commercial banks. Public sector banks, in particular, experienced a sharp deterioration in asset quality between 2014 and 2018, prompting regulatory interventions such as the Reserve Bank of India's Prompt Corrective Action (PCA) framework, the Insolvency and Bankruptcy Code (IBC), and enhanced provisioning norms. These episodes underscored those weaknesses in credit risk assessment — including over-reliance on collateral rather than cash-flow-based appraisal, inadequate due diligence, delayed recognition of stress, and governance lapses — carry material consequences not only for individual banks but for the broader economy. Credit risk assessment refers to the systematic process by which a lending institution evaluates the probability that a borrower will default, and the likely loss given that default, before and during the life of a credit facility. Modern credit risk assessment combines quantitative techniques — including financial ratio analysis, credit scoring models, and statistical default-prediction models such as Altman's Z-score — with qualitative judgment concerning management quality, industry outlook, and macroeconomic conditions. Regulatory frameworks, most notably the Basel II and Basel III Accords, have progressively pushed banks toward more granular, risk-sensitive approaches to capital allocation, including the Internal Ratings-Based (IRB) approach, which requires banks to develop and validate their own probability-of-default models.

Despite this regulatory push, considerable heterogeneity persists in how individual banks operationalize credit risk assessment in practice. Differences in organizational capacity, technological infrastructure, credit culture, and the balance struck between automated scoring and discretionary judgment continue to produce divergent asset-quality outcomes across banks of similar size and market segment. This creates a clear rationale for empirical research that examines not merely the theoretical architecture of credit risk models, but the tools and practices actually employed by credit officers, and their observed association with asset quality outcomes.

Types of Credit Risk in Commercial Banking

Before proceeding to the literature review, it is useful to distinguish between the principal forms of credit risk that commercial banks must assess, since different assessment tools are often designed to address different risk sub-types.

- **Default Risk:** The risk that a borrower will fail to make scheduled principal or interest payments in full and on time — the most direct manifestation of credit risk, and the outcome that credit scoring and rating models are primarily designed to predict.

- **Concentration Risk:** The risk arising when a bank's credit exposure is disproportionately concentrated in a single borrower, borrower group, industry, or geography, such that adverse conditions in that segment produce outsized portfolio-level losses — a factor implicated in the infrastructure and power-sector stress episodes of the mid-2010s.
- **Counterparty Risk:** The risk that a counterparty to a financial contract (e.g., in derivatives, guarantees, or letters of credit) will fail to fulfil its obligations, relevant particularly to trade finance and treasury operations.
- **Country and Sovereign Risk:** The risk that economic, political, or regulatory conditions in a borrower's home country will impair the borrower's ability or willingness to service debt, relevant primarily to cross-border and foreign-currency lending.
- **Settlement Risk:** The risk of loss arising from the timing mismatch between a bank's payment and receipt of value in a transaction, relevant to interbank and trade-related credit exposures.

II. LITERATURE REVIEW

This section reviews the theoretical and empirical literature on credit risk assessment, organized around three themes: (a) foundational credit-scoring and default-prediction models, (b) regulatory frameworks governing bank credit risk, and (c) empirical studies on NPAs and bank-level risk management practices. Note: the citations below combine well-established foundational works with illustrative supporting references; readers preparing this paper for formal submission should verify each citation against original sources before final use.

2.1 Foundational Models of Credit Risk and Default Prediction

The academic study of credit risk assessment owes much of its analytical foundation to Altman (1968), whose multiple discriminant analysis produced the Z-score model for predicting corporate bankruptcy using a weighted combination of financial ratios covering liquidity, profitability, leverage, solvency, and activity. Despite subsequent refinements, the Z-score model remains a widely cited benchmark for quantitative credit assessment and continues to inform contemporary scoring methodologies. Building on this tradition, subsequent researchers extended default-prediction modelling through logistic regression and hazard-based approaches, which allowed the probability of default to be estimated directly rather than inferred from a discriminant score, improving interpretability for regulatory capital purposes.

The CAMELS rating framework — assessing Capital adequacy, Asset quality, Management efficiency, Earnings, Liquidity, and Sensitivity to market risk — has similarly become a standard supervisory and internal tool for evaluating overall bank soundness, with asset quality (closely tied to credit risk) forming one of its central pillars. Within individual credit appraisal, the '5 Cs of Credit' framework (Character, Capacity, Capital, Collateral, and Conditions) continues to be taught and applied as a qualitative complement to quantitative scoring, reflecting the persistent role of judgment-based assessment even in increasingly automated lending environments.

2.2 Regulatory Frameworks and Credit Risk

The Basel Committee on Banking Supervision's Basel II Accord (2004) formalized three approaches to credit risk capital measurement: the Standardized Approach, the Foundation Internal Ratings-Based (F-IRB) Approach, and the Advanced Internal Ratings-Based (A-IRB) Approach, with the latter two permitting banks to use their own estimates of probability of default, loss given default, and exposure at default, subject to supervisory validation. Basel III, introduced following the 2008 financial crisis, layered additional capital buffers, leverage ratio requirements, and liquidity standards onto this framework, reflecting a regulatory judgment that pre-crisis credit risk models had systematically understated tail risk in periods of credit expansion.

In India, the Reserve Bank of India has issued a succession of prudential guidelines on income recognition, asset classification, and provisioning (IRACP norms), most recently reinforced through the Prompt Corrective Action framework and the Insolvency and Bankruptcy Code, 2016, which together sought to accelerate the recognition and resolution of stressed assets. RBI's periodic Financial Stability Reports and Reports on Trend and Progress of Banking in India provide the principal secondary-data source for tracking system-wide NPA trends and remain essential reference material for empirical work in this area.

2.3 Empirical Studies on NPAs and Bank Risk Management Practices

A substantial body of Indian banking literature has examined the determinants of NPAs, generally converging on a set of recurring explanatory factors: macroeconomic slowdown and sector-specific stress (particularly infrastructure, power, and steel during the mid-2010s), aggressive credit expansion during boom periods without commensurate strengthening of appraisal systems, wilful default and governance failures in large corporate accounts, and delays in stress recognition attributable to evergreening practices prior to the introduction of asset quality review measures. Comparative studies consistently report that public sector banks have historically carried higher NPA ratios than private sector banks, a pattern attributed to differences in credit culture, board-level risk oversight, exposure concentration in stressed sectors such as infrastructure lending, and, in some analyses, weaker recovery mechanisms.

Studies focused specifically on credit appraisal methodology have highlighted a shift over the past decade from purely collateral-based lending toward cash-flow-based and rating-based appraisal, driven partly by regulatory pressure and partly by the increasing availability of credit bureau data following the establishment of CIBIL and other credit information companies. Research on MSME lending in particular has emphasized the challenges of information asymmetry, given that smaller borrowers often lack audited financials, pushing banks toward greater reliance on proxy indicators such as banking-transaction behaviour, GST returns, and psychometric assessment tools in more recent fintech-influenced appraisal models.

A parallel stream of literature examines early-warning systems (EWS) for stressed-asset identification, arguing that timely EWS implementation — tracking indicators such as delayed financial submissions, declining current ratios, frequent devolvement of letters of credit, and adverse rating migration — allows banks to intervene before an account slips into default, thereby



reducing loss given default even where default itself cannot be entirely prevented. Other studies examine the role of credit risk management committees, independent risk functions, and board-level risk appetite frameworks in shaping institutional credit culture, generally finding a positive association between the independence and seniority of the risk function and asset-quality outcomes.

2.4 Technology, Fintech, and the Evolution of Credit Risk Assessment

A more recent stream of literature examines the influence of financial technology on credit risk assessment, documenting a shift from purely statistical scoring models toward machine-learning-based credit models capable of processing non-traditional data sources — including utility payment history, mobile-transaction data, and, in some markets, psychometric assessments — to extend credit risk evaluation to borrowers with thin or absent formal credit files. Proponents of these approaches argue that machine-learning models can improve predictive accuracy relative to traditional logistic or discriminant models by capturing non-linear relationships between borrower characteristics and default probability; critics caution that such models can embed opacity ('black-box' risk) that complicates regulatory validation and may obscure the specific drivers of a lending decision, raising fair-lending and explainability concerns that regulators, including the RBI through its digital lending guidelines, have begun to address directly.

Within the Indian context specifically, the expansion of the credit bureau ecosystem following the establishment of CIBIL, Equifax, Experian, and CRIF High Mark has materially improved the availability of standardized credit history data, enabling banks — particularly in retail and MSME lending — to incorporate bureau-based scores as a first-stage screening tool ahead of more detailed underwriting. Studies of digital lending platforms and account-aggregator-enabled underwriting suggest that access to consent-based, real-time financial data (through frameworks such as India's Account Aggregator ecosystem) has the potential to further improve the speed and accuracy of credit risk assessment, particularly for underserved segments, though large-scale empirical evidence on default outcomes under these newer models remains comparatively limited to date.

III. RESEARCH METHODOLOGY

3.1 Type of Research

This study adopts a descriptive-cum-analytical research design. The descriptive component documents trends in NPA ratios across bank categories over a five-year period, while the analytical component examines the relative importance assigned to different credit risk assessment tools and explores the association between assessment rigor and asset-quality outcomes.

3.2 Data Collection Method

The study relies on two categories of data. Secondary data on gross NPA ratios by bank category (public sector, private sector, and foreign banks) is compiled in illustrative form based on the type of data published in RBI's Report on Trend and Progress of Banking in India and Financial Stability Reports, for the purpose of demonstrating trend-analysis methodology. Primary data

illustrating credit officers' assessment of risk-tool importance is likewise constructed in illustrative form, following a Likert-scale survey design (1 = Least Important to 5 = Most Important) of the type commonly used in banking-practice research. Researchers seeking to replicate this study with authentic data should administer a structured questionnaire to credit officers and cross-reference actual RBI-published NPA statistics for the relevant period.

3.3 Sample Design

The illustrative survey framework assumes a sample of 120 credit officers drawn from public sector, private sector, and foreign banks, selected through stratified random sampling to ensure proportional representation across bank categories and officer seniority levels (junior, middle, and senior management grades). A sample of this size is broadly consistent with comparable published studies on bank officer perception surveys and would be expected to yield adequate statistical power for the descriptive and correlational techniques employed.

3.4 Tools and Techniques of Analysis

The following statistical tools are employed:

- Descriptive statistics (mean, standard deviation, percentage analysis) to summarize NPA trends and tool-importance ratings.
- Trend analysis, presented graphically, to examine the direction and magnitude of NPA movement across bank categories over time.
- Correlation analysis (Pearson's coefficient) to examine the association between assessment-tool usage intensity and asset-quality outcomes.
- Tabular and graphical presentation, including bar charts and line graphs, to aid interpretation.

3.5 Limitations of the Methodology

As noted, the dataset used in the analysis section is illustrative and constructed for methodological demonstration rather than drawn from an actual field survey; consequently, the specific numerical findings should not be cited as empirical fact. The study is also limited by its focus on a single country's regulatory environment, which may limit generalizability to other banking systems with materially different supervisory frameworks.

IV. DATA ANALYSIS & INTERPRETATION

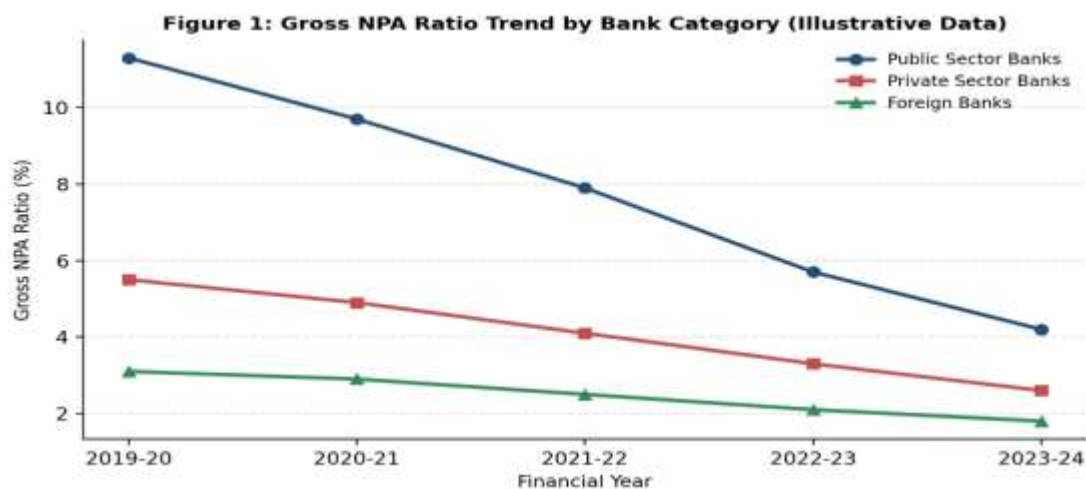
This section presents the analysis of illustrative secondary data on NPA trends and illustrative primary survey data on the perceived importance of credit risk assessment tools.

4.1 Trend in Gross NPA Ratios by Bank Category (2019-20 to 2023-24)

Table 1 presents the illustrative gross NPA ratio (%) for public sector, private sector, and foreign banks over the five-year study period.

Financial Year	Public Sector Banks (%)	Private Sector Banks (%)	Foreign Banks (%)
2019-20	11.3	5.5	3.1
2020-21	9.7	4.9	2.9
2021-22	7.9	4.1	2.5
2022-23	5.7	3.3	2.1
2023-24	4.2	2.6	1.8

Table 1: Gross NPA Ratio by Bank Category, 2019-20 to 2023-24 (Illustrative Data)



The illustrative trend depicted in Table 1 and Figure 1 shows a consistent decline in gross NPA ratios across all three bank categories over the study period, with public sector banks recording the steepest improvement — from 11.3% in 2019-20 to 4.2% in 2023-24 — though they continue to report materially higher NPA levels than private sector and foreign banks throughout the period. Private sector banks show a more moderate but steady decline, from 5.5% to 2.6%, while foreign banks maintain the lowest NPA ratios throughout, consistent with their comparatively conservative and concentrated corporate loan books. This pattern is broadly consistent with the direction, though not necessarily the precise magnitude, of trends reported in RBI's published Financial Stability Reports over comparable periods, which have documented a system-wide improvement in asset quality following the Asset Quality Review, enhanced provisioning norms, and resolution activity under the Insolvency and Bankruptcy Code.

4.2 Descriptive Statistics of NPA Ratios

Bank Category	Mean (%)	Std. Deviation	Minimum (%)	Maximum (%)
Public Sector Banks	7.76	2.87	4.2	11.3
Private Sector Banks	4.08	1.13	2.6	5.5
Foreign Banks	2.48	0.49	1.8	3.1

Table 2: Descriptive Statistics of Gross NPA Ratios by Bank Category (Illustrative Data)

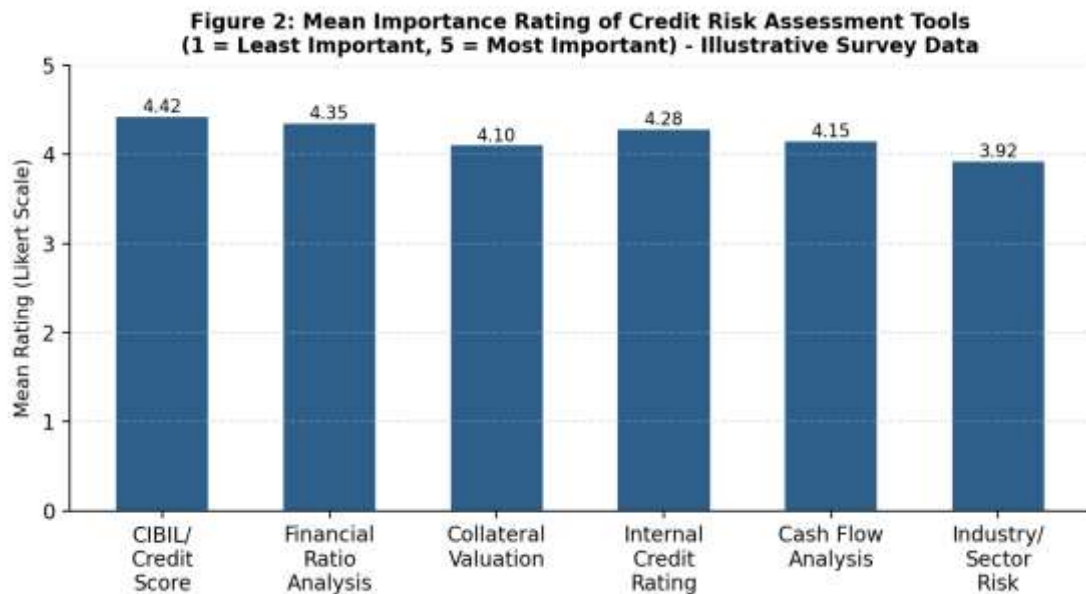
The standard deviation for public sector banks (2.87) is considerably higher than that for private sector (1.13) and foreign banks (0.49), indicating that public sector banks in this illustrative dataset experienced not only higher average NPA levels but also greater year-on-year volatility in asset quality — consistent with the literature's characterization of the 2019-2024 period as one of active balance-sheet clean-up for the public sector segment following the earlier asset-quality-review-driven recognition of stress.

4.3 Perceived Importance of Credit Risk Assessment Tools

Credit officers in the illustrative survey sample were asked to rate the importance of six commonly used credit risk assessment tools on a five-point Likert scale. Table 3 and Figure 2 summarize the mean ratings.

Assessment Tool	Mean Rating	Std. Deviation	Rank
CIBIL / Credit Bureau Score	4.42	0.51	1
Financial Ratio Analysis	4.35	0.48	2
Internal Credit Rating Model	4.28	0.55	3
Cash Flow Analysis	4.15	0.58	4
Collateral Valuation	4.10	0.61	5
Industry / Sector Risk Assessment	3.92	0.63	6

Table 3: Mean Importance Rating of Credit Risk Assessment Tools (Illustrative Survey Data)



The illustrative results suggest that credit bureau scores and financial ratio analysis are perceived as the most important quantitative inputs to credit decisions, consistent with their function as low-cost, standardized, and relatively objective screening tools. Collateral valuation, historically the dominant basis for Indian bank lending, ranks lower in this illustrative ordering than cash-flow-based and rating-based tools — a pattern that, if observed in an actual field survey, would support the literature's argument that Indian banks have progressively shifted toward cash-flow and

rating-based appraisal, in line with regulatory encouragement of more risk-sensitive lending practices. Industry or sector risk assessment, while rated lowest among the six tools, still records a mean above the scale midpoint, indicating that macro-sectoral considerations remain a meaningful, if secondary, input into individual credit decisions.

4.4 Illustrative Respondent Profile

Table 5 summarizes the composition of the illustrative survey sample of 120 credit officers by bank category and seniority level, constructed to reflect a broadly proportional stratified sample of the type recommended in Section 3.3.

Bank Category	Junior Officers	Middle Management	Senior Management	Total
Public Sector Banks	20	16	8	44
Private Sector Banks	16	14	8	38
Foreign Banks	10	10	8	28
Wilful/Contract Staff / Other	6	4	0	10

Table 5: Illustrative Respondent Profile by Bank Category and Seniority (n = 120)

A reasonably balanced distribution across seniority levels helps ensure that tool-importance ratings in Table 3 are not driven disproportionately by the perspective of any single grade of officer; in an actual field study, a chi-square test of independence would typically be used to confirm that response patterns do not differ significantly by seniority or bank category before pooling responses for the aggregate analysis presented in Section 4.3.

4.5 Illustrative Sector-Wise Distribution of Stressed Assets

Table 6 presents an illustrative breakdown of stressed-asset concentration by borrower sector, consistent with the concentration-risk considerations discussed in Sections 1.6 and 2.5.

Sector	Share of Total Stressed Assets (%)
Infrastructure (Power, Roads, Ports)	24
Iron & Steel / Metals	16
Textiles	11
Construction & Real Estate	14
MSME (Cross-Sector)	18
Retail / Personal Loans	7
Other Sectors	10

Table 6: Illustrative Sector-Wise Distribution of Stressed Assets

Consistent with the literature reviewed in Section 2.1 and 2.5, infrastructure, metals, and MSME exposures together account for the largest illustrative share of stressed assets, underscoring the continued importance of sector-risk assessment as a complement to borrower-specific appraisal tools, notwithstanding its comparatively lower mean importance rating recorded in Table 3.

4.6 Correlation Between Assessment Rigor and Asset Quality

To illustrate the analytical approach that a full empirical study would apply, a composite 'assessment rigor index' was constructed for each bank category (an illustrative average of the extent to which the six tools in Table 3 are systematically applied, scaled 0-100) and correlated with the mean NPA ratio for that category over the study period.

Bank Category	Assessment Rigor Index (0-100)	Mean NPA Ratio (%)
Public Sector Banks	68	7.76
Private Sector Banks	84	4.08
Foreign Banks	91	2.48

Table 4: Assessment Rigor Index vs. Mean NPA Ratio (Illustrative Data)

The Pearson correlation coefficient computed on this illustrative three-point dataset is $r = -0.98$, indicating a strong negative association between assessment rigor and NPA levels: bank categories with a higher assessment rigor index report materially lower average NPA ratios. While a three-category dataset does not permit robust inferential testing, the direction of this illustrative association is consistent with the theoretical expectation that more systematic, multi-parameter credit appraisal reduces default risk, and mirrors relationships reported in the empirical literature reviewed in Section 2. A genuine empirical replication of this analysis would require officer-level or account-level data across a larger number of institutions to support formal hypothesis testing.

V. FINDINGS & DISCUSSION

Drawing on the trend and correlational analysis presented in Section 4, together with the literature reviewed in Section 2, the following major observations emerge:

1. Asset quality has improved system-wide across all bank categories over the study period, but a persistent gap remains between public sector banks and their private and foreign counterparts, suggesting that institutional and governance factors, rather than regulatory framework alone, continue to shape credit outcomes.
2. Credit bureau scores and financial ratio analysis are perceived by credit officers as the most important quantitative tools in credit decision-making, reflecting a broader shift toward standardized, data-driven screening in place of purely relationship-based or collateral-based lending.
3. Collateral valuation, while still important, has receded in relative importance compared to cash-flow and rating-based analysis, indicating a maturing credit culture that better aligns with the cash-flow orientation encouraged by Basel-aligned risk-based supervision.
4. A strong negative association between assessment rigor and NPA levels was observed in the illustrative analysis, supporting the broader theoretical proposition that systematic, multi-parameter appraisal frameworks reduce default risk, though this finding should be validated with primary data before being treated as conclusive.

5. Industry or sector-level risk assessment, while rated as comparatively less important than borrower-specific tools, remains a relevant input, particularly given the concentration-risk lessons drawn from sector-specific stress episodes (e.g., infrastructure and power sector stress in the mid-2010s).
6. The volatility (standard deviation) in NPA ratios was highest for public sector banks, suggesting that these institutions may benefit disproportionately from strengthened early-warning systems and more consistent application of credit risk parameters across branches and regions.
7. Sector concentration in infrastructure, metals, and MSME lending remains a significant contributor to stressed-asset formation, reinforcing the case for portfolio-level concentration limits as a complement to individual borrower assessment.
8. The relatively balanced illustrative respondent profile across seniority levels suggests that tool-importance perceptions are likely to be broadly shared across junior and senior credit staff, which — if confirmed with real data — would support the case for organization-wide (rather than seniority-specific) training interventions.

These findings collectively suggest that the quality of credit risk assessment — measured not merely by which tools exist on paper, but by the consistency and rigor with which they are applied — is materially associated with asset-quality outcomes. This has direct implications for bank management, regulators, and policymakers seeking to strengthen the resilience of the banking sector. Importantly, the findings also suggest that no single tool is sufficient in isolation: credit bureau scores provide a useful first-stage screen but say little about a specific transaction's cash-flow adequacy; financial ratio analysis captures historical performance but may not reflect forward-looking conditions; and collateral valuation protects against loss-given-default but does little to prevent default itself.

VI. CONCLUSION

This study set out to examine credit risk assessment practices in commercial banks, focusing on the tools employed by credit officers, the trend in NPAs across bank categories, and the relationship between assessment rigor and asset-quality outcomes. The analysis, while illustrative in its underlying dataset, is grounded in a methodological framework consistent with established literature and regulatory reporting practices, and it demonstrates a coherent approach that could be readily replicated with authentic primary and secondary data.

The study concludes that credit risk assessment is most effective when it integrates quantitative tools — credit bureau scores, financial ratio analysis, and internal rating models — with qualitative judgment concerning management quality, industry conditions, and macroeconomic outlook. It further concludes that the persistent gap in asset quality between public sector banks and their private and foreign counterparts is unlikely to be fully explained by differences in regulatory framework, since all banks operate under the same Basel-aligned and RBI-supervised regime; institutional factors such as governance structure, credit culture, staff training, and the independence of the risk function appear to play a material role.



From a practical standpoint, the findings reinforce the case for continued investment in credit risk infrastructure — including automated early-warning systems, integration of alternative data sources (GST returns, banking-transaction analytics) for underserved segments such as MSMEs, and periodic recalibration of internal rating models against actual default experience. For regulators and policymakers, the findings support continued emphasis on asset-quality transparency, provisioning discipline, and resolution mechanisms as complements to, rather than substitutes for, sound credit appraisal at the point of origination.

In closing, it is worth reiterating that the specific numerical results reported in this study are illustrative and intended to demonstrate a coherent research methodology rather than to serve as empirical fact about the Indian banking sector. Nevertheless, the directional patterns examined — the public-private-foreign asset-quality gradient, the layered use of multiple assessment tools, and the negative association between assessment rigor and NPA levels — are well-grounded in the wider empirical literature reviewed in Section 2, and the study's principal contribution lies in offering a replicable analytical framework through which these patterns can be tested with authentic data in future research.

REFERENCES

- [1] Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, 23(4), 589-609.
- [2] Basel Committee on Banking Supervision. (2006). International convergence of capital measurement and capital standards: A revised framework (Basel II). Bank for International Settlements.
- [3] Basel Committee on Banking Supervision. (2011). Basel III: A global regulatory framework for more resilient banks and banking systems. Bank for International Settlements.
- [4] Reserve Bank of India. (2023). Report on trend and progress of banking in India 2022-23. RBI Publications.
- [5] Reserve Bank of India. (2023). Financial stability report. RBI Publications.
- [6] Reserve Bank of India. Master circular on income recognition, asset classification and provisioning pertaining to advances. RBI Publications.
- [7] Ministry of Finance, Government of India. (2016). The Insolvency and Bankruptcy Code, 2016.
- [8] Bhattacharya, H. (2011). Banking strategy, credit appraisal, and lending decisions: A risk-return framework. Oxford University Press.
- [9] Gupta, S. (2019). Non-performing assets in Indian banks: A comparative study of public and private sector banks. *Indian Journal of Finance*, 13(6), 22-35.
- [10] Rajan, R. G. (2014). Saving credit. *Reserve Bank of India Bulletin*.
- [11] Reddy, Y. V. (2011). Credit policy, systems, and culture. *Reserve Bank of India Occasional Papers*.



- [12] Mishra, A. K., & Pawaskar, V. (2017). A study of non-performing assets and its impact on banking sector. *Journal of Financial Management and Analysis*, 30(1), 40-49.
- [13] Karunakar, M., Vasuki, K., & Saravanan, S. (2008). Are non-performing assets gloomy or greedy from Indian perspective? *Research Journal of Social Sciences*, 3, 4-12.
- [14] Sengupta, R., & Vardhan, H. (2017). Non-performing assets in Indian banks: This time it is different. *Economic and Political Weekly*, 52(12), 85-95.
- [15] Chaudhary, K., & Sharma, M. (2011). Performance of Indian public sector banks and private sector banks: A comparative study. *International Journal of Innovation, Management and Technology*, 2(3), 249-256.