GMR
The Original

IMPACT OF CREDIT RISK ON BANKS' PROFITABILITY: A CASE STUDY ON IDBI BANK

Mr. Subash Chandra Patra*[1] Dr. Ashok Kumar Sar [2]

[1] Research Scholar KIIT School of Management, KIIT University, Patia, Bhubaneswar, Odisha, India Pin:751024
[2]Professor KIIT School of Management, KIIT University, Patia, Bhubaneswar, Odisha, India Pin:751024

Abstract: - Banking system is building block of Indian economy contributing nearly 7.70% of national GDP and providing employment to around 1.50 million. Past poor credit risk management by PSU as well private Banks has shaken the Indian economy by eroding their profit, a major problem which is studied in the context of IDBI Bank. The primary goal of the study is to examine how solid credit risk management affects the banks' enhanced proficiency metric. The research questions are to find out the relationship between "Credit risk management" indicators like "GNPLR (Gross nonperforming loan ratio)", "CRWA (Credit risk weighted asset)" with the "ROE (return on equity)" of banks. The scope of the study is limited to IDBI Bank. Quantitative research method will be used for the study by collecting secondary data from the past 17 years financial of the IDBI Bank from its website. Co-relation and Linear multiple regression statistical methods is used by using SPSS software. The research findings indicate that, there is inverse relationship between the credit risk management and profitability in IDBI Bank. Hence it is suggested that the Banks should adopt suitable credit risk management tools to enhance their profitability to remain resilient and competitive in the market.

Keywords: GNPLR, CRWA, ROE, Credit risk.

1. INTRODUCTION:

Banking business involves taking deposit from public and lending the money to public in turn earning interest difference from the interest received from lending activities to interest paid to the depositor (Campbell, A.,2007). Banking business deals with public money and risky in nature. Banking is a profitability business and main objective is to maximize the shareholder's return. The return comes at the price of risk taken by the Bank. Higher return achieved by taking higher risk. Out of all the risk perceived by Bank, major risk has been contributed by the risk of default made by the borrower in meeting its timely repayment obligation called the Credit default (Campbell, A.,2007) The anticipated cash flow gets affected due to credit risk which ultimately impacts the overall profitability, stability and resilience strength of a Bank. Bank has to balance between risk and return, too much of risky business may harm the profitability of the Bank, and no risk there will be less return. Throughout the banking industry's history, many financial institutions have given in to stagnation brought on by subpar credit risk management practices in an attempt to boost shareholder returns on capital invested in the bank. (Das & Ghosh, 2007). Credit lending involves judicious calculation of balancing between a manageable risk and non-manageable risk. Hence it is very important to design some model to measure the credit risk. Basel committee has supplemented a lot in this area. The scope of the analysis is to find out how the various profitability indicators has been affected by weak credit decisions. Here "GNPLR (Gross non performing loan ratio)" and "CRWA (Credit risk weighted asset)" has been taken as yardstick towards measure of Credit risk. ROE (Return on equity) has been taken as yardstick towards measure of profitability indicator (Hedlund, M., & Krabbe, J.,2024). To test the study the yard sticks as proxy for credit risk and profitability has been taken from IDBI bank, which was earlier a DFI (Development financial institution) and how it had been transformed in to a commercial bank w.e.f. 2006. How its profitability was impacted during poor credit risk management strategies followed then by the bank for which regulator has imposed PCA on it. How better credit risk management strategy has transformed IDBI Bank from a loss-making Bank to a strength Bank is a classic example of poor credit management processes that has caused reduced profit of the bank. Further, the study also involves what are the credit risk management strategies followed by the weak bank to come out of this situation to a sound profit making bank with in time span of 6 years. IDBI Bank which was under stress and PCA (Prompt corrective action) and revived to a strong Bank with a time span of 4-5 years due to following strategic credit risk management technique to register a robust profitability. The secondary data has been collected from the pre-PCA era to present post-PCA era various proxies measures of credit risk management and profitability. Linear co-relation and multiple regression analysis is used to establish the association of various "Credit risk management indicators" with major profitability indicators in terms of return on equity of shareholders' money invested in the Bank in time range from Year-2008 to 2025. Although few literatures have been found in globally, but less studies are carried in the domestic context w.r.t. India by taking GNPLR & CRWA as credit risk management proxy to relate the it's impact on ROE. Hence this study will be useful for banks to adopt micro credit risk management techniques, portfolio diversification, capital light business, capital conservative process by focusing more on retail advances etc. to enhance the profitability of Bank in long run. Following are the research objectives adopted for this research study:

- To measure the various CRM indicators and its impact on earning proficiency of the Bank.
- To know the optimal amount of risk during credit decision a Bank needs to take in order to maximise the profitability

as well as shareholder's value.

The following research questions are adopted:
1) What is the relationship between GNPLR & ROE of Bank?
2) What is the relationship between CRWA & ROE of Bank?
3) What is the impact of GNPLR, CRWA on ROE of the Bank?
4) Is it important for Banks to have certain level of GNPLR, CRWA to optimise ROE?

2) LITERATURE REVIEW:

2.1) Concept of Risk:

In generally sense risk evolves from the uncertainty or unpredictability with respect to a Bank/financial institutions anticipated income as well as losses. Hence it is a compromise between risk and return.

The concept of risk has evolved significantly across academic disciplines, resulting in diverse and sometimes competing definitions. Early economic scholarship, particularly Knight (1921), distinguished between *risk* and *uncertainty*, defining risk as situations where probabilities are known and uncertainty as cases where probabilities are indeterminate. This distinction laid the foundation for quantitative risk modelling in finance, insurance, and decision theory. Later, Holton (2004) refined this perspective by arguing that risk involves exposure to uncertain outcomes where probabilities matter, but interpretation depends on context and stakeholder perspective. These early formulations positioned risk as a measurable construct rooted in probability theory.

Engineering and operational research traditions further conceptualized risk as the combination of probability and consequence (Kaplan & Garrick, 1981). Within this framework, risk assessment involves identifying hazards, estimating likelihoods, and evaluating potential impacts. However, Aven (2012) critically reviewed this definition and argued that equating risk strictly with probability × consequence is insufficient because it neglects the underlying uncertainty and knowledge limitations that shape assessments. Aven (2016) further proposed that risk should be understood as the "effect of uncertainty on objectives," aligning with ISO-based frameworks and emphasizing decision contexts.

Psychological research introduced a major shift in understanding risk by emphasizing perception and cognitive processes. Slovic (1987, 2000) demonstrated that individuals evaluate risks based on qualitative characteristics such as dread, familiarity, and controllability rather than statistical probability. This body of literature shows a consistent gap between expert risk assessments and public perception, suggesting that risk is partly subjective and socially interpreted. Renn (1998) synthesized decades of interdisciplinary research and argued that risk must be understood through a combination of technical analysis and social interpretation, integrating scientific measurement with public deliberation.

Sociological literature further expanded the concept of risk beyond technical calculation. Beck (1992) introduced the "risk society" thesis, arguing that modern societies are increasingly organized around the anticipation and management of technologically produced risks. In this view, risk is embedded in power structures, institutional arrangements, and socio-economic inequalities. Similarly, Giddens (1990) emphasized that modernity amplifies manufactured risks that are global in scope and difficult to predict using traditional models. These perspectives highlight that risk is socially constructed and politically negotiated.

Recent scholarship increasingly conceptualizes risk as systemic and interconnected. Aven and Renn (2009) argued that risk should be framed as an event with uncertain outcomes affecting something of value, thereby incorporating systemic interactions and knowledge uncertainty. Literature on systemic risk in finance and infrastructure demonstrates that interdependencies create cascading failures that cannot be captured through isolated risk metrics. This shift reflects growing recognition of complexity theory and network-based risk modeling.

In management studies, risk has been reframed within strategic and organizational contexts. Enterprise Risk Management (ERM) frameworks conceptualize risk as multidimensional—encompassing strategic, operational, financial, and reputational aspects (Power, 2004). Contemporary research emphasizes that risk includes both threats and opportunities, suggesting that effective organizations balance risk mitigation with value creation. This perspective integrates risk with governance, accountability, and performance measurement.

Environmental and disaster risk research conceptualizes risk as the interaction between hazard, exposure, and vulnerability. Scholars argue that risk cannot be understood without considering social vulnerability and adaptive capacity (Renn, 2008). This framework underscores the distributive and ethical dimensions of risk, recognizing that marginalized populations often bear disproportionate exposure to harm.

Finally, philosophical and epistemological debates question whether risk is objective or subjective. Hansson (2010) argues that risk contains both descriptive and normative elements, as judgments about acceptable risk levels inherently involve value considerations. These debates reinforce that risk is not merely a technical calculation but also a moral and political concept.

Risk management process is the series of integrated processes followed to minimise a Bank's potential expected and unexpected losses. Risk taking means assumption of incremental risk in order to generate incremental gain. Risk taking is an opportunistic context. The Banks and financial institutions which takes more risk, earns more profitability; and the banks which takes less risk, earns less profitability (Coyle, B., 2000).

2.2.1) Credit Risks: Credit risk is the most important factor in banking book management with regard to a bank's profitability (Gray, B., & Cassidy, C. RBA.,1997). A borrower's inability or unwillingness to meet its contractual

obligations is called credit default risk, and this uncertainty can arise from both internal and external reasons. The risk during credit appraisal related to a single borrower is reckon obligor risk, and related to a collection of borrowing entities are called "Portfolio credit risk". Because lending financial institutions have made lending decisions based on diverse industry cohorts, rating bands, and sectors, their books are subject to portfolio risk. Both systematic and idiosyncratic risks impact the risk of the obligor and the portfolio.
Systematic risks are generally "Industry specific" or resulted from "Macroeconomic factors" like economic recession, volatility & drop in commodity price etc. (Kaufman, G. G., & Scott, K. E.,2003) Whereas idiosyncratic credit risks are "Borrower specific" problem example management problems, poor financials etc. Banks can manage the risk by using various external tools like scrutinizing the credit information bureaus (CIBIL) record of entities to assess the credit track record of the borrower for judging those borrowers with poor credit vision score or good credit score and adopting differentiation price strategy based upon individual CIBIL score (Ahmed, M. I., & Rajaleximi, P. R.,2019), also commercial score for entities and CRILIC report for large borrowers having exposure above Rs.5 crore.
The major factors for calculating credit risk are:

a) Probability of default (PD): The probability of default is to be estimated on the internal rating scores assigned carried on various product credit scoring and rating models. A risk rating of company is the rating bands which is a yardstick to place the company in the correct order with regard to their individual probability of default (PD). The main purpose of the calculating the PD is to predict the probability whether a loan will come under default category in the next year. As per Basel guideline, Capital adequacy of the Bank to be determined based on PDs, for which it is important for a bank to calculate the PD (Altman, E., Resti, A., & Sironi, A.,2004).

b) Exposure at default (EAD): In the event that the counterparty defaults, it is the anticipated outstanding balance that will remain unpaid.

c) Loss Given default (LGD): It is an estimation of probability that a borrower's inability to repay his timely obligations. It is calculated as 100%-(Recovery amount/EAD) = 100%-Recovery rate.

d) Correlation risk: Generally, a commercial Bank keeps many assets in their credit portfolio with varied degree of risk. Then finding degree of association or correlation is a very important task for the Bank. The various assets are grouped in to various sub-pools depending on their common risk characteristics. A Bank can assimilate grade wise pools, industry pools, Loan to value ratio wise pools, region wise pools, zone wise or rural, urban, semiurban. Bank can estimate default correlations.

2.2.2) Calculation of ECL (Expected credit loss):
ECL is the expected average loss over a particular time horizon that is measured and utilized to reduce credit risk losses through preventive measures. ECL are cost of doing business & can be minimized by operating income. In case of loan losses, Risk based pricing has been followed by the banks based upon internal rating and eternal rating of the borrower. The lower the risk, higher will be rate of interest charged to the customer and vice versa. Banks follow estimation of RAROC (Risk adjusted return on capital) over it's cost of fund, as well as above prescribed minimum targeted return (MTR) or huddle rate consisting opportunity cost of investment of the bank's capital deployed in the lending to borrowers. Suppose the cost of fund as calculated based upon FTP method (Fund transfer pricing) method is 8.50% and MTR is 12.50%, then RAROC from the lending to the borrower must be above the cost of fund as well as MTR for ensuring credit risk loss and profitability, so that shareholder, s capital value can be optimized.
The formula for "ECL (Expected credit loss) = EAD (Exposure at default) x PD (probability of default) x LGD (Loss given default)"

2.2.3) Calculation of UL (Unexpected credit loss): Losses above expected levels are usually measured as unexpected loss. This actually occurs due to sudden actual default. Capital cushion is required for mitigating unexpected losses. Hence, risk weights specified under Basel: II/III standardized approach basically captures the unexpected loss part. In Basel internal rating-based approach (IRB), the banks are only required to hold capital against the unexpected loss. In statistical term, this is standard deviation of loss distribution

$$UL = EAD * \sqrt{[(PD^2 * \sigma^2_{LGD}) + (LGD^2 * \sigma^2_{PD})]}$$

.

σ^2_{LGD} = Variance of loss given default = $(LGD)(1 - LGD)/4$

σ^2_{PD} = Variance of probability of default = $(PD)(1 - PD)$

2.2.4) Minimisation of Credit risk: It consist of various processes-
❖ **Measurement of risk**: Internal/External Rating will enable the Bank to calculate the regulatory (Basel II/Basel III) as well as economic capital charge.

❖ **Risk based pricing:** The pricing on loans can be fixed based on past experience, by quantifying the risk through estimating EL and UEL. The resulting price will be risk free price and risk charge or premium.

RAROC: "Risk Adjusted Return" on capital is the most commonly used tool measure the return on the borrowers based upon their risk rating score and is determined for any particular account by using the following formula i.e. [(Net Income - Expected losses)/Regulatory capital] (Bauer, D., & Zanjani, G.,2021).

❖ **Risk based lending**: Through credit rating/scoring differentiate credit worthy borrowers from those who could be risky and take credit decision (Muller, C., Juelsrud, R. E., & Andersen, H.,2021. The Credit risk weighted asset (RWA) is calculated as: RWA= Risk weight assigned (K)x12.50xEAD. Based upon rating there will be capital requirement of regulatory capital/Economic capital. Higher the RWA (risk weighted asset), higher will be capital provisioning causing capital erosion to the Bank. As per regulator RBI, various percentage of risk weights (RW) have been assigned to various loans based upon their external rating, such as, Loans guaranteed by sovereign guarantee carries 0% CRWA, Loan to "AAA/A+ rated" companies carries 20% CRWA, "AA/A1 rated companies": 30% CRWA, "A/A2 rated companies":50% CRWA, "BBB/A3 rated companies":100% CRWA, "BB & below rated companies":150% CRWA, all the regulatory retail credit exposure up to Rs.7.50 crore as per the ambit of RBI definition attracts 75% CRWA.

❖ **Control of risk**: By implementing effective operational guideline of loan policy and credit risk management policy released by risk management/credit department in the central office.

❖ **Portfolio diversification**: By grouping the borrowers in terms of similar risk characteristics (sectoral pool, rating pool, LTV pool etc.) for better monitoring of high-risk customers, maintain portfolio level of provisioning and undertake diversification strategy. Diversification gives strength to manage the risk but doesn't eliminate risk (Shao, X. F., Yue, X. G., & Qiu, J.,2020).

2.3) Basel Regulatory capital framework:

Following the financial market meltdown and the 1973 breakdown of the Bretton Woods system of controlled exchange rates, the "Basel Committee on Banking Supervision" was established. The primary goal of BCBS is to improve global banking supervision's quality and supervisory expertise in order to increase financial stability. Basel I, Basel II, and Basel III are the three regulatory capital measures that BCBS has issued thus far (Goodhart, C.,2011).

Basel: I-1988 (India enacted in year 1993)- Analysed 2 major risk parameter, Credit & Market risk and capital requirement for minimize the risk. It has advised capital and RWA for Bank. The benchmark risk capital was estimated at 8% of total risk weighted asset.

Basel: II -2006 (India enacted in year 2008)- The main risk is associated with Credit, Market, operational, credit concentration, Interest rate risk. The benchmark regulatory capital is 9% of the total risk weighted asset.

Basel: III-2010 (India enacted in year 2013)- Based on three parts, or pillars. Pillar 1 is credit risk. Pillar 2, Supervisory review and Pillar 3 is the market discipline through prescribed public disclosures. It has given additional capital cushion in form of CCB (Capital conservation buffers) and counter cyclical capital buffer. Minimum enhanced regulatory capital requirement was prescribed at 11.50% of the RWA.

Basel: III, minimum regulatory capital requirement for commercial banks in India

Minimum capital ratio	% Risk Weighted Asset
Minimum common equity Tier: I (CET1)	5.5
Additional Tier 1	1.50
Minimum Tier 1 capital	7
Capital conservation buffer	2.5
Minimum CET1+CCB	8
Minimum Tier 1+CCB	9.50
Tier 2	2
"Minimum Total capital"	9
"Minimum total capital +CCB"	11.50

- "Common equity Tier: I capital ratio= Common Equity tier-I capital divided by RWA for credit risk+ Market risk+ Operational risk."
- "Tier I Capital ratio= Tier I capital divided by RWA for credit risk+ Market risk+ Operational risk."
- "Total Capital ratio (CRAR) is equal to Eligible total capital divided by RWA for credit risk+ Market risk+ Operational risk."

3) CREDIT RISK & PROFITABILITY INDICATORS:

The main credit risk management indicators are GNPLR, CRWA which affects the profitability of the commercial banks by reducing ROE of the Banks. Profitability of banks can be affected by more CRWA exposures attracting higher capital provisioning. Hence by portfolio diversification profitability can be optimized by the bank with building granular portfolio specially in the segment of RAM (Retail, Agriculture & MSME) & corporate exposure with good rating of "A" and above attracting lower CRWA and more profitability by reducing concentration risk for the Banks. Credit default risk can be

minimised with lower CRWA and less chance of adding GNPLR in the bank's portfolio, which ultimately increase the net interest margin of the bank and credit cost can be minimised with enhanced profitability for Banks. In India, RBI has kept certain thresh hold for banks, in terms of profitability, CRAR, NPA ceiling; breaching of the same will cause implementation of PCA upon Banks with limited business expansion as a capital conservation for banks to take corrective steps for recovery and reduction of GNPLR.

- GNPLR (Gross Non performing loan ratio): Proportion of assets not earning any income to the total assets (Khairi, A., Bahri, B., & Artha, B.,2021)
- Return on equity (ROE) of a bank is calculated by dividing net profit to the total capital of the Bank (Damodaran, A.,2007)
- PCA is the prompt corrective action which is a measure of RBI to control and regulate various function of the Bank when it breaches certain parameters prescribed by RBI (Kashyap, N., Mahapatro, S., & Tantri, P.,2022)
- A bank's asset or off-balance-sheet exposure that is weighted based on the risk of that asset type is known as CRWA (credit risk-weighted asset). For banks and financial institutions, the Capital Adequacy Ratio (CRAR) or capital requirement is calculated using this type of asset computation. The credit ratings supplied by qualified external rating agencies are used to generate the risk weights associated with the assets in order to compute RWA under the Standardized approach for calculating capital charge for credit risk under Basel (Le Lesle, V., & Avramova, M. S.;2012).

4) IMPACT OF CREDIT RISK MANAGEMENT ON BANKS' PROFITABILITY:

1. Kumari, R., Singh, P. K., & Sharma, V. C. (2017) examined how non-performing assets (NPA) affected major PSU and private sector banks' return on assets (ROA) between 2013 and 2017 and discovered that NPA significantly decreases the ROA.
2. According to a study by Kumar Sahoo (2023), the profitability of commercial banks in India is directly correlated with effective non-performing asset (NPA) management, which impacts their return on equity (ROE) and return on asset (ROA). The study used secondary data from the annual audit reports of five public and five private banks from the RBI over a 15-year period, from 2003 to 2018.
3. According to the research on the effect of credit risk management on the profitability of European commercial banks conducted by Zou, Y., and Li, F. (2014). The secondary data was gathered between 2007 and 2012 from 47 commercial banks in Europe. The bank's profitability was measured using ROA and ROE, while credit risk management was measured using NPLR and CAR. The results show that whereas CAR has a little impact on ROA and ROE, NPLR has a large impact.
4. NPLR shows an inverse association with performance metrics, according to a study by Islam, K. M., Alam, M. B., & Hossain, M. M. (2019) on the effect of credit risk management on banks' performance in Bangladesh. Secondary data was gathered from 23 commercial banks between 2006 and 2015.
5. According to a study on the effects of credit risk management in Pakistani banks by Hamza, S. M. (2017). The results show an unfavourable relationship between credit risk management and bank performance. According to the study, return on asset is significantly impacted by CAR (capital adequacy ratio), LLPR (loan loss provision ratio), LR (liquidity ratio), and NPLR (nonperforming loan ratio).
6. According to a study by Achou et al. (2008), NPLR, a measure of credit risk management, shows an inverse association with bank profitability metrics like ROA and ROE.
7. According to a 2009 study on credit risk management and the profitability of Swedish commercial banks by Hosna, A., Manzura, B., and Juanjuan, S. on the basis of secondary data sources. The model uses ROE as a profitability indicator and NPLR and CAR as credit risk indicators. The results show that, in contrast to CAR, NPLR significantly affects ROE.
8. According to a 2010 study by Kithinji, A. M. on credit risk management and commercial bank profitability in Kenya, the amount of credit and non-performing loans had no bearing on a commercial bank's profit. Profitability is positively impacted by portfolio diversity.
9. According to a study conducted in Nepal by Poudel (2012), which examined the effect of credit risk management on bank profitability among 31 banks, credit risk management metrics such as yield on advances and CRAR had a negative correlation with profitability.

5) RESEARCH METHODOLOGY:

To perform the research study quantitative research method would be considered to find out the empirical link between the constructs (Watson, 2015). Secondary data on different credit risk and profitability parameters of IDBI Bank for the period of 17 years from 2008- 2025 has been collected from the Annual report of IDBI Bank. The information has been gathered based on a number of indicators, such as ROE (return on equity), which serves as a stand-in for profitability and is measured by independent variables such as CRWA (credit risk weighted asset) and non-performing loans ratio (GNPLR).

6) DATA ANALYSIS & INTERPRETATION:

6.1) Impact of GNPLR (%) and ROE (%):

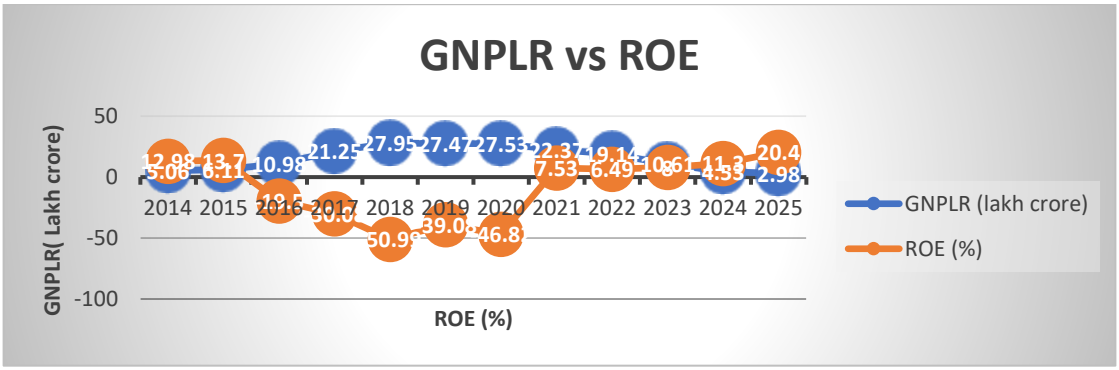

Table-1: Relationship between GNPLR & ROE.

Financial Years	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
GNPLR	5.06	6.11	10.98	21.25	27.95	27.47	27.53	22.37	19.14	10.61	4.53	2.98
ROE	12.98	13.70	-19.50	-30.08	-50.99	-39.08	-46.82	7.53	6.49	8.00	11.30	20.40

From this data analysis of IDBI Bank, It is clearly pertinent that, GNPLR was at 2.50% during Year-2014 and the ROE was 12.98%; but during Year-2018 crisis the GNPLR has risen to 27.95% and depleted the ROE to negative of (-50.99), again gradually bank has management it's Credit risk parameters and reduced the GNPLR to the bracket of 22.37% during year-2021 and resulted positive ROE of 7.53%. Hence it is inferred from the above analysis that GNPLR has inverse relationship with ROE in context of IDBI Bank.

6.2) Impact Credit Risk-RWA (lakh crore) on ROE (%):

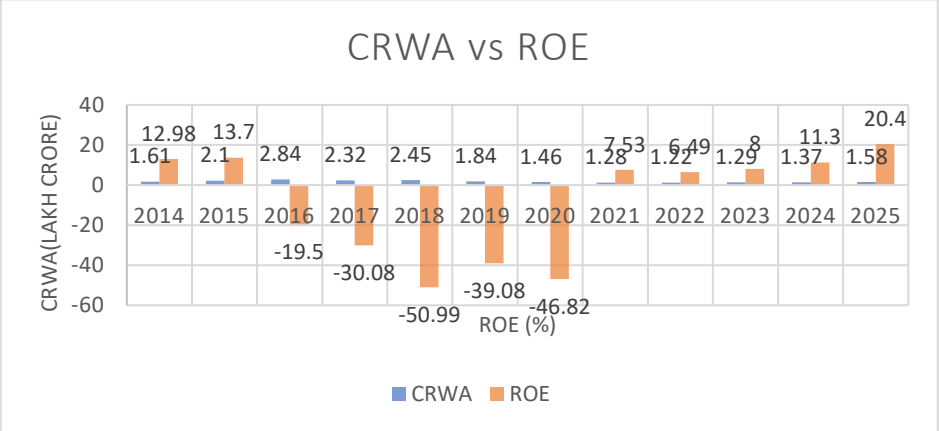

Table-2: Relationship between CRWA & ROE.

Financial Years	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CRWA	1.61	2.10	2.84	2.32	2.45	1.84	1.46	1.28	1.22	1.29	1.37	1.58
ROE	12.98	13.70	-19.50	-30.08	-50.99	-39.08	-46.82	7.53	6.49	8.00	11.30	20.40

From this data analysis of IDBI Bank, It is clearly pertinent that, CRWA was at Rs.1.61 lakh crore during Year-2014 and ROE was at positive level of 12.98% **;** but during Year-2018 crisis the CRWA has risen to Rs.2.45 lakh crore and ROE was at highest negative level of (-50.99%) again gradually bank has reduced the CRWA to the bracket of Rs.1.58 lakh crore during year-2025, ROE was at positive level of 20.40%. Hence it is inferred from the above analysis that CRWA has inverse relationship with ROE in context of IDBI Bank.

6.3) Impact GNPLR (%), Credit Risk-RWA (lakh crore) on ROE (%):

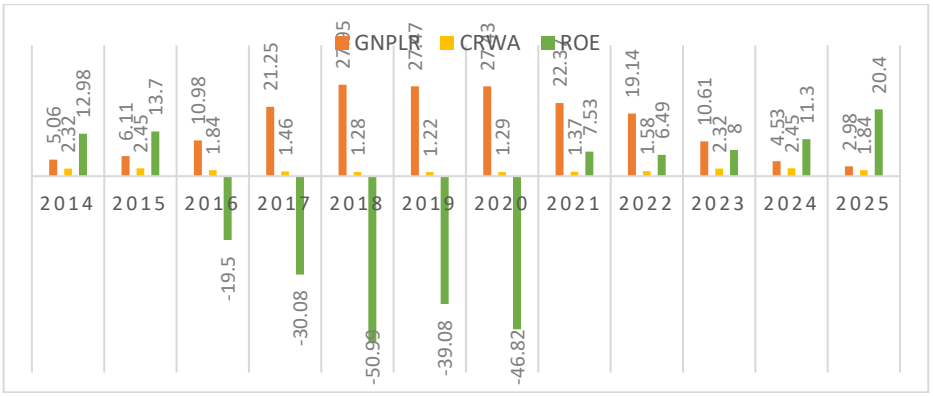

Table-3: Relationship between GNPLR, CRWA & ROE.

Financial Years	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
GNPLR	5.06	6.11	10.98	21.25	27.95	27.47	27.43	22.37	19.14	10.61	4.53	2.98
CRWA	2.32	2.45	1.84	1.46	1.28	1.22	1.29	1.37	1.58	2.32	2.45	1.84
ROE	12.98	13.70	-19.50	-30.08	-50.99	-39.08	-46.82	7.53	6.49	8.00	11.30	20.40

From this data analysis of IDBI Bank, it is clearly pertinent that both GNPLR & CRWA has inverse relationship with ROE.

7) RESEARCH FINDINGS

The validity, reliability, normalcy, and hypothesis of this study are being investigated. Every variable in the reliability and validity test is qualified. This is because the Cronbach alpha value is higher than 0.7 and the anticipated value of r is higher than the table r. Along with the symptoms of heteroskedasticity and multicollinearity, the distribution of the data is also checked for normalcy. Concurrent testing of partial hypotheses is carried out. The data processing program SPSS 25 is used to analyze the relationship between independent and dependent variables at a 95% confidence level, or α = 5%.

7.1) Impact of GNPLR on ROE of IDBI Bank:

Table:4. T Test: Impact of GNPLR on ROE.

Model		Coefficients		t	Sig.
		Beta	Std. Error		
1	(Constant)	25.79	8.7453	2.9500	0.01453
	GNPLR	-2.2349	0.48278	-4.6293	0.000937

Regression Equation: - $Y = \beta 0 + \beta 1 x1$

$ROE(Y) = 25.79 - 2.2349 * x1$

The GNPLR variable has a sig value of 0.000937 < 0.05 and a t-count value of 4.6293 > 4.437 t-tables. The rejection of H0 and acceptance of H1 indicate that the GNPLR factors had a major impact on IDBI Bank's ROE. with a significance level of 0.000937 < 0.05. Simultaneous tests are used to determine whether independent variables are affecting dependent variables. Hypothesis testing is done by comparing F-calculated findings with F-tables at a significance threshold of 0.05%. In this study, the F-table value was 4.46.

Table:5. F Test

(ANOVA)						
[Model]		(SS) Sum of Squares	Degree of freedom(df)	(MS) Mean Square	(F-value)	Significance.
1	(Regression)	5270.37	1	5270.37	21.93	0.0009371
	(Residual)	2459.29	10	245.9293		
	Total	7729.66	11			
a. Dependent Variable: ROE						
b. Predictors: (Constant), GNPLR						

H0 is rejected and H1 is accepted based on the F-count of 21.93 > 19.68 F-table and significant values of 0.0009371 < 0.05. If this argument is correct, GNPLR has a major simultaneous impact on profitability. R2 analysis is used to calculate

the percentage or amount that independent variables in regression models contribute to the influence of dependent variables. The coefficient of numbers thus indicates the extent to which the developed model can account for the actual conditions.

Table:6. Determinant Test

R analysis				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.8257	0.6818	0.6500	15.6821
a. Predictors: (Constant), GNPLR				
b. Dependent variable: ROE				

The R number is 0.8257, meaning that the correlation between the variables of GNPLR to ROE is 82.57%. The determination value (R2) obtained is 0.6818, this means that the percentage of contribution of GNPLR variables in the regression model is 68.18 % and the relationships that occur are very strong, while the remaining 31.82 % is explained by other variables that were not studied or not included in the study. Based on the results of the above analysis, it can be concluded that GNPLR is able to make a large or strong contribution to the ROE of IDBI Bank. This is because, Banks having proper credit risk management will reduce GNPLR and improve ROE of Bank. The conclusion is that the lower the level of GNPLR it can improve good performance.

7.2) Impact of CRWA on ROE of IDBI Bank:

Table:7. T Test: Impact of CRWA on ROE

Model		Coefficients		t	Sig.
		Beta	Std. Error		
1	(Constant)	35.03	25.46	1.3755	0.1989
	CRWA	-0.000245	0.00013	-1.7912	0.1035

Regression Equation: - Y= β0+ β2x2
ROE(Y) = 35.03 - 0.000245*x2
The CRWA variable has a sig value of 0.1035 >0.05 and a t-count value of 1.7912 < 1.796 t-tables. The acceptance of H0 and rejection of H2 indicate that the CRWA variables had no discernible effect on IDBI Bank's ROE. The t-count value for the CRWA variable is 1.7912 < 1.796 t-tables with a sig value of 0.1035 > 0.05. The acceptance of H0 and rejection of H2 indicate that the CRWA variable has a partial impact on IDBI Bank's ROE. Simultaneous tests are used to determine whether independent variables are affecting dependent variables. Hypothesis testing is done by comparing F-calculated findings with F-tables at a significance threshold of 0.05%. In this study, the F-table value was 4.46.

Table:7. F Test

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1877.22	1	1877.22	3.20	0.1035
	Residual	5851.94	10	585.19		
	Total	7729.66	11			
a. Dependent Variable: ROE						
b. Predictors: (Constant), GNPLR, CRWA						

H0 is approved and H3 is rejected based on the F-count of 3.20 > 2.645 F-table and significant values of 0.1035 > 0.05. If this argument is rejected, CRWA does not have a major simultaneous influence on profitability. R2 analysis is used to calculate the percentage or amount that independent variables in regression models contribute to the influence of dependent variables. The coefficient of numbers thus indicates the extent to which the developed model can account for the actual conditions.

Table:8. Determinant Test

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.4928	0.2429	0.1672	24.190

a. Predictors: (Constant), CRWA
b. Dependent variable: ROE

The connection between the variable CRWA and ROE is 49.28%, as indicated by the R value of 0.4928. The obtained determination value (R2) is 0.2429, which indicates that the CRWA variable contributes 24.29% of the regression model and that the relationships are only partially strong. Other variables that were not examined or included in the study account for the remaining 75.71%. It is clear from the preceding analysis's findings that CRWA can contribute to IDBI Bank's ROE to some extent. This is due to the fact that banks with effective credit risk management will enhance their ROE and minimize CRWA to some extent. The conclusion is that it can get better the lower the CRWA level

7.3) Combined Impact of GNPLR & CRWA on ROE of IDBI Bank:

Table:6. T Test

Model		Coefficients		t	Sig.
		Beta	Std. Error		
1	(Constant)	60.201	12.83	4.6914	0.0028
	GNPLR	-2.114	0.356	-5.934	0.000832
	CRWA	-0.000203	6.56	-3.095	0.019268

Regression Equation: - Y= β0+ β1x1+ β2x2
ROE(Y) = 60.201-2.114 *x1 - 0.000203*x2
The GNPLR variable has a sig value of 0.0028 < 0.05 and a t-count value of 5.934 > 4.437 t-tables. The rejection of H0 and acceptance of H3 indicate that the GNPLR factors had a major impact on IDBI Bank's ROE. The t-count value for the CRWA variable is 3.095 > 2.718 t-tables with a sig value of 0.0028 < 0.05. The rejection of H0 and acceptance of H3 indicate that the CRWA variable has a partial impact on IDBI Bank's ROE.

Table:7. F Test

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6538.57	2	3269.28	24.70	0.0002213
	Residual	1199.09	9	132.343		
	Total	7729.66	11			
a. Dependent Variable: ROE						
b. Predictors: (Constant), GNPLR, CRWA						

H0 is rejected and H3 is accepted based on the F-count of 24.70 > 5.069 F-table and significant values of 0.00022 < 0.05. If this idea is correct, GNPLR and CRWA have a substantial simultaneous impact on profitability. R2 analysis is used to calculate the percentage or amount that independent variables in regression models contribute to the influence of dependent variables. The coefficient of numbers thus indicates the extent to which the developed model can account for the actual conditions.

Table:8. Determinant Test

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.919732	0.845907	0.811664	11.50406
a. Predictors: (Constant), NPLR, CRWA				
b. Dependent variable: ROE				

The connection between the variables of GNPLR and CRWA to ROE is 91.97%, as indicated by the R number of 0.919732. The determination value (R2) obtained is 0.845, which indicates that the GNPLR and CRWA variables contribute 84.59% of the regression model and that the relationships are very strong. Other variables that were not examined or included in the study account for the remaining 15.41%. The aforementioned analysis's findings indicate that GNPLR and CRWA together can significantly or significantly boost IDBI Bank's ROE.

8) CONCLUSION:

On the above analysis; it was envisaged that the Credit risk management has inverse relationship with profitability. GNPLR has direct inverse relationship with ROE where as CRWA has partial inverse relationship with ROE whereas their combined impact has strong impact on ROE; GNPLR & CRWA concurrently has inverse relationship with ROE

w.r.t. IDBI Bank. A better credit risk management strategy followed by a Bank will result in overall profitability increasing the various profitability indicators like ROA, ROE, NII, NIM, CRAR whereas reduce the Credit-RWA and vice versa.

REFERENCES:

1. Campbell, A. (2007). Bank insolvency and the problem of nonperforming loans. Journal of Banking Regulation, 9(1), 25-45.
2. Gray, B., & Cassidy, C. (1997, May). RBA (1997). In Credit risk in banking: proceedings of a conference at HC Coombs Centre for Financial Studies (pp. 1-2).
3. Coyle, B. (2000). Measuring credit risk. Global Professional Publishing.
4. Das, A., & Ghosh, S. (2007). Determinants of credit risk in Indian state-owned banks: An empirical investigation.
5. Aven, T. (2012). The risk concept—Historical and recent development trends. Reliability Engineering & System Safety, 99, 33–44. https://doi.org/10.1016/j.ress.2011.11.006
6. Aven, T. (2016). Risk assessment and risk management: Review of recent advances on their foundation. European Journal of Operational Research, 253(1), 1–13. https://doi.org/10.1016/j.ejor.2015.12.023
7. Aven, T., & Renn, O. (2009). On risk defined as an event where the outcome is uncertain. Journal of Risk Research, 12(1), 1–11. https://doi.org/10.1080/13669870802488883
8. Beck, U. (1992). Risk society: Towards a new modernity. Sage Publications.
9. Giddens, A. (1990). The consequences of modernity. Stanford University Press.
10. Hansson, S. O. (2010). Risk: Objective or subjective? Journal of Risk Research, 13(2), 231–241. https://doi.org/10.1080/13669870903126226
11. Holton, G. A. (2004). Defining risk. Financial Analysts Journal, 60(6), 19–25. https://doi.org/10.2469/faj.v60.n6.2669
12. Kaplan, S., & Garrick, B. J. (1981). On the quantitative definition of risk. Risk Analysis, 1(1), 11–27. https://doi.org/10.1111/j.1539-6924.1981.tb01350.x
13. Knight, F. H. (1921). Risk, uncertainty and profit. Houghton Mifflin.
14. Power, M. (2004). The risk management of everything: Rethinking the politics of uncertainty. Demos.
15. Renn, O. (1998). Three decades of risk research: Accomplishments and new challenges. Journal of Risk Research, 1(1), 49–71. https://doi.org/10.1080/136698798377321
16. Renn, O. (2008). Risk governance: Coping with uncertainty in a complex world. Earthscan.
17. Slovic, P. (1987). Perception of risk. Science, 236(4799), 280–285. https://doi.org/10.1126/science.3563507
18. Slovic, P. (2000). The perception of risk. Earthscan Publications.
19. Hedlund, M., & Krabbe, J. (2024). Understanding the Dynamics of Credit Risk Management and Bank Profitability: Evidence from European Banking Institutions.
20. Turan, H. (2016). The weighting of factors affecting credit risk in banking. Procedia economics and finance, 38, 49-53.
21. Kaufman, G. G., & Scott, K. E. (2003). What is systemic risk, and do bank regulators retard or contribute to it?. The independent review, 7(3), 371-391.
22. Ahmed, M. I., & Rajaleximi, P. R. (2019). An empirical study on credit scoring and credit scorecard for financial institutions. International Journal of Advanced Research in Computer Engineering & Technology (IJARCET), 8(7), 2278-1323.
23. Altman, E., Resti, A., & Sironi, A. (2004). Default recovery rates in credit risk modelling: a review of the literature and empirical evidence. Economic notes, 33(2), 183-208.
24. Bauer, D., & Zanjani, G. (2021). Economic capital and RAROC in a dynamic model. Journal of Banking & Finance, 125, 106071.
25. Muller, C., Juelsrud, R. E., & Andersen, H. (2021). Risk-based pricing in competitive lending markets (No. 19/2021). Working paper.
26. Le Lesle, V., & Avramova, M. S. (2012). Revisiting risk-weighted assets. International Monetary Fund.
27. Shao, X. F., Gouliamos, K., Luo, B. N. F., Hamori, S., Satchell, S., Yue, X. G., & Qiu, J. (2020). Diversification and desynchronicity: An organizational portfolio perspective on corporate risk reduction. Risks, 8(2), 51.
28. Goodhart, C. (2011). The Basel Committee on Banking Supervision: A history of the early years 1974–1997. Cambridge University Press.
29. Khairi, A., Bahri, B., & Artha, B. (2021). A literature review of non-performing loan. Journal of Business and Management Review, 2(5), 366-373.
30. Hadian, N., & Phety, D. T. O. (2021). The effect of non-performing loans and loan to deposit ratio on return on assets in the banking industry. Turkish Journal of Computer and Mathematics Education, 12(8), 791-798.
31. Damodaran, A. (2007). Return on capital (ROC), return on invested capital (ROIC) and return on equity (ROE): Measurement and implications. Return on Invested Capital (ROIC) and Return on Equity (ROE): Measurement and Implications (July 2007).
32. Kashyap, N., Mahapatro, S., & Tantri, P. (2022). Preventing Strategic Defaults in Response to Deteriorating Bank Health: The Prompt Corrective Action Approach. SSRN Electronic Journal.
33. Singh, A. K., & Bansal, P. (2016). Impact of financial leverage on firm's performance and valuation: A panel data analysis. Indian Journal of Accounting, 48(2), 73-80.
34. Zou, Y., & Li, F. (2014). The impact of credit risk management on profitability of commercial banks: A study of

Europe.
35. Islam, K. M., Alam, M. B., & Hossain, M. M. (2019). Impact of Credit Risk Management on Bank Performance: Empirical Evidence from Bangladesh. South Asian Journal of Management, 26(2).
36. Hamza, S. M. (2017). Impact of credit risk management on banks performance: A case study in Pakistan banks. European Journal of Business and Management, 9(1), 57-64.
37. Achou, T. F., & Tenguh, N. C. (2008). Bank performance and credit risk management. Master Degree Project, Finance Universitu of Skodve School of Technology and Society.
38. Hosna, A., Manzura, B., & Juanjuan, S. (2009). Credit risk management and profitability in commercial banks in Sweden. rapport nr.: Master Degree Project 2009: 36.
39. Kithinji, A. M. (2010). Credit risk management and profitability of commercial banks in Kenya.
40. Aduda, J., & Gitonga, J. (2011). The relationship between credit risk management and profitability among the commercial banks in Kenya. Journal of Modern Accounting and Auditing, 7(9), 934.
41. Poudel, R. P. S. (2012). The impact of credit risk management on financial performance of commercial banks in Nepal. International Journal of arts and commerce, 1(5), 9-15.
42. Annual Reports of IDBI Bank 2005-2023.
43. RBI, ―Reports on Trend and Progress of Banking