IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES
ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, 2022

CREDIT RISK MANAGEMENT OF BANKS IN INDIA AND UK WITH SPECIAL REFERENCE TO GREEN LENDING

Sunandan Sharma [A], Dr. Ranjana Kothari [B]
Research Scholar in Amity University Gurgaon
Associate Professor in Amity University Gurgaon

ABSTRACT— The purpose of this study is to empirically examine how green lending concept has affected the credit risk management of enterprises in a number of banks in the UK and India. This includes green lending policy framework, the level of practices and their variance across Indian and UK banks. To accomplish these aims and objectives, the researcher exploits data on online portals, bank customers and stakeholders using mostly quantitative methods. The data collected is further analyzed using several statistical techniques including paired samples t-test, correlation analysis and the generalized linear model regression. The results of these techniques show some significant differences between the banks and financial indicators related to their green lending practices. Presented results indicate that UK banks have achieved a significantly higher rate of the green loan ratio than Indian banks, indicating more developed green finance frameworks. Thus, the differences in the institutional, regulatory and firm characteristics affect the green loan and credit risk impingement on agreement or disagreement. This research contributes to the viability of knowledge on sustainable finance and is beneficial for policymakers, regulators and banking institutions to establish relevant procedures and schemes on the role and salience of their institutional characteristics to be accounted. Evidently, in India, green lending and credit risk can be dependent on institutional characteristics such as the company's age, size, and board of directors.

KEYWORDS- ***Green lending, Credit risk management, Sustainable finance, Comparative analysis, banking sector***

INTRODUCTION:

The banking sector supports sustainable economic growth while minimizing environmental risks through its lending activities. In credit risk management the lending to green projects, which can be defined as projects or initiatives designed to achieve environmental sustainability, has become a vital part of Indian and the United Kingdom's banking systems.

Background on Green Lending and Credit Risk Management

"Green lending" refers to loans and other financial services that promote environmentally conscious projects, which can be allocated to renewables, energy-efficient infrastructure, or business processes that are sustainable in nature. When banks implement their lending on the basis of environmental concerns, they reduce the risks to which they might be subjected due to changes in climate, regulation, and stranded assets.

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, 2022

Banks manage credit risk, the most important part of their business, by controlling the probability of a default by a borrower or other adverse credit occurrence and its impact on the lender to ensure a bank's financial stability and long-run profitability. Introduction of green lending's ideas to the frameworks is more relevant as all key players in the banking eco-system including stakeholders, regulators and society pay much more consideration to sustainable development.

Importance of the Study

This research study holds significant importance in the context of sustainable finance and risk management for several reasons:

1. **Sustainable Finance: The research adds to the current literature in the field of sustainable finance by investigating the relationship between green lending and credit risk management. The particular research is relevant because financial institutions around the globe are seeking to integrate environmental, social, and governance policies into their operations, and, thus, the results provide useful information on the advantages and disadvantages of green lending policies.**

2. **Risk Management. Evaluating the effect of green lending on credit risk management, the study provides a full picture of the risks and opportunities related to lending focused on sustainability. Such information may contribute to the creation of successful risk management strategies as well as provide banks with the tools to develop further lending portfolios.**

3. **Regulatory Compliance: Considering the regulatory push on environment sustainability, and necessary disclosures about climate related risks, the present research will certainly aid banks to negotiate the changing landscape and comply with the existing and new negotiating and regulatory framework.**

4. **Comparative Analysis: The comparative nature of this research to study lending framework and credit risk management in India and the UK, offers very interesting imprints about how two countries manage their credit risk, given the dearth of literature. Most significantly, it will enable relevant authorities such as policymakers, regulators and industry participants to understand the similarity and difference between the economies and strategically develop solutions suiting their respective economies.**

Brief Overview of Research Objectives and Methodology

The primary objective of this research is to examine how certain green lending rules in the United Kingdom and India have affected the way these banks handle credit risk. The following are the aims of the study:

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, 2022

1. To understand the framework and practices of the lending policies, including green lending, in the selected Indian and UK banks.

2. To identify the differences in the bank lending policy, including green lending and practices in relation to credit risk management between Indian and UK banks.

3. To determine the impact of green lending on credit quality and the methods and tactics for managing credit risk and other financial outcomes in the banking industry.

The present research uses a quantitative approach, and the data is collected online from the bank and customer portal and stakeholders data which is made available publically. Data is analyzed using statistical and computational tools such as Paired Samples t-test, correlation analysis, and additionally GLM regression model can be used to reach the conclusion to measure the research objectives. Therefore, the study aims to contribute to the existing knowledge of sustainable finance and provide recommendations to the policy, regulator, and bank authority in India, UK, and all other nations.

Literature Review

Numerous studies have investigated the correlation between environmentally conscious lending, credit risk management, and the financial success of banks in several countries with varying regulatory frameworks.

Zenger, Lain, and Cui (2020) obtained that Chinese banks with high green credit ratios have lower non-performing loan ratios, thus indicating that green loans are usually of better quality compared to non-green loans. At the same time, Liao, and Yang (2019) showed ambiguous outcomes, where green lending decreases credit risk for state-owned and increases for non-state-owned banks in China, which is determined by the specifics of the institution.

In the Indian context, Biswas (2021) concluded that the adoption of green banking practices, including green lending, has a positive impact on financial performance indicators such as return on assets and return on equity for Indian banks. Conversely, Jha and Bhome (2016) found that the implementation of green banking initiatives in India faces challenges due to lack of awareness, inadequate training, and high initial costs focusing on the UK, Broderick (2017) examined the role of regulatory frameworks in promoting green lending and sustainable finance. The study highlighted the importance of clear guidelines and incentives from regulatory bodies like the Bank of England and the Financial Conduct Authority (FCA) in driving the adoption of green lending practices by UK banks.

Cross-country comparative studies are limited, but Bahl (2012) Nishikant Nirala reviewed green lending practices of Indian and British banks and found that British banks are far more advanced in embedding environmental concerns into their lending policies and risk frameworks. Although, the study was conducted more than 10 years ago and the green

lending landscape has changed significantly since that time. This literature provides good insights, but additional more recent and comprehensive comparative research information is required about the connection between green lending programmers, methods for managing credit risk, and financial success metrics in both industrialized and developing nations like India and the United Kingdom.. The influence of institutional variables, such as regulatory policies, market structure, and corporate governance mechanisms on green lending adoption and influence on credit risk management is another important topic researchers have to explore. (Creswell & Creswell, 2018)

Research gaps

There is limited recent comparative research conducted on green lending practices and their effects on credit risk management in developed and developing countries, including the UK and India. While some studies have been conducted on individual countries, existing comparative studies are outdated as they do not reflect the dramatic changes in the green lending scenario that have taken place over the last ten years. The literature review shows a lack of understanding of the influence of institutional factors such as regulatory policy, market structure, and corporate governance mechanisms on the uptake of green lending and its implications for credit risk management. Determining these factors is essential for creating feasible strategies and policies in alignment with the unique contexts of different countries and banking systems. Finally, so far, no comprehensive empirical analysis utilizes various financial indicators to determine interrelations between green lending, credit risk, and bank performance in the UK and Indian banking sectors. Most studies only focus on limited indicators or variables, creating a biased picture and failing to establish complex relationships. Similarly, not enough empirical research uses advanced statistical methods such as GLM regression analysis to investigate the key predictors and pinpoint the obstacles to sustainable finance. This is how the study seeks to address potential limitations and contribute to the existing knowledge base suitable for policymakers, regulating bodies, and banking institutions in India, the UK, and other countries.

Methodology

Research Approach

For this investigation, researchers opted for a quantitative method. A quantitative research approach employs numerical data, statistical analysis, and computing tools to conduct a "systematic empirical investigation of the quantitative properties and phenomena and their relationship.” Such an approach was chosen to empirically study the impact of lending policies and calculate possible correlations between various financial metrics.

Data Collection

The researchers gathered data from several online portals and the data of potential customers and stakeholders of banks, both in India and the UK as they selected a purposive sample of

eight UK-based banks and eight India-based banks, each including both private and public sector banks for ease of analyzing the banking sector in each country.

Analytical Techniques

The study employed the following statistical and computational techniques for data analysis:

Paired Samples t-tests

Paired samples t-tests were run on the UK banks and Indian public sector banks and private sector bank's financial metrics including credit risk, green loan ratio, efficiency, leverage, loan loss provisions, funding cost, Tier 1 capital ratio and loan rate while trying to find the differences in green credit interest and financial performance between the groups. (Howell, 2012).

Correlation Analysis

Correlation analysis was done to evaluate financial indicators' relationship with green lending and credit risk. Those indicators were efficiency, leverage, loan loss provisions, funding cost, Tier 1 capital ratio, and loan rate. The strength and direction of the association were determined by the Pearson correlation coefficient, which helped analyze interactions between lending and credit risk management. (Field, 2018).

Generalized Linear Model (GLM) Regression Analysis

A generalized linear model regression analysis was used to analyze the determinants of green lending and credit risk. The amount of green loans given by banks and credit risk measures were utilized as dependent variables. On the other hand, the independent variables were efficiency ratio, leverage ratio, loan loss provision, Tier 1 capital ratio, loan rate, and log of total assets to determine the factors that affect green lending practice and credit risk management in the banking industry in the UK and India. (Dobson & Barnett, 2008).

The analytical techniques used were selected to fulfill the purposes of the research and obtain a detailed picture of lending policies and green practices, credit risk management as well as the relationship between these three variables and financial indicators in the banking industries of the UK and India.

Data Analysis

The statistical techniques are utilized. The findings of the research are presented and explained in the next sections.

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, 2022

Paired Samples t-tests

There were additional paired sample t-tests made to compare UK banks to Indian banks, while comparing private and public sector among them. The obtained difference was significant in several aspects:

1. **Green Loan Ratio**: UK banks exhibited a significantly higher green loan ratio (M = 0.27, SD = 0.09) compared to Indian private sector banks (M = 0.11, SD = 0.06) and public sector banks (M = 0.14, SD = 0.08), $t(7) = 4.21$, $p < 0.01$ and $t(7) = 3.68$, $p < 0.01$, respectively . This suggests that UK banks have more developed green lending practices.

2. **Efficiency Ratio**: UK banks demonstrated higher efficiency (M = 0.62, SD = 0.11) than Indian private sector banks (M = 0.48, SD = 0.09) and public sector banks (M = 0.51, SD = 0.07), $t(7) = 2.89$, $p < 0.05$ and $t(7) = 2.41$, $p < 0.05$, respectively . This indicates better resource utilization by UK banks.

3. **Leverage Ratio**: The leverage ratio was significantly higher for UK banks (M = 0.88, SD = 0.06) compared to Indian private sector banks (M = 0.79, SD = 0.04) and public sector banks (M = 0.81, SD = 0.05), $t(7) = 3.12$, $p < 0.05$ and $t(7) = 2.67$, $p < 0.05$, respectively. This suggests a greater reliance on debt financing or deposit acceptance by UK banks.

4. **Loan Loss Provisions**: Indian private sector banks (M = 0.06, SD = 0.02) had significantly higher loan loss provisions than UK banks (M = 0.03, SD = 0.01), $t(7) = -3.89$, $p < 0.01$. No significant difference was found between UK banks and Indian public sector banks.

5. **Funding Cost**: UK banks exhibited lower funding costs (M = 0.04, SD = 0.02) compared to Indian private sector banks (M = 0.07, SD = 0.03), $t(7) = 2.51$, $p < 0.05$. No significant difference was observed between UK banks and Indian public sector banks.

These findings highlight the differences in green lending practices, efficiency, leverage, credit risk management, and funding structures between UK banks and Indian banks.

Correlation Analysis

Pearson's correlation analysis was performed to examine the relationships between green lending, credit risk, and other financial indicators. The results revealed several significant correlations:

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, 2022

1. A negative correlation was found between the green loan ratio and credit risk measures (non-performing loan ratio and loan loss provisions) for both UK banks ($r = -0.71$, $p < 0.05$) and Indian banks ($r = -0.62$, $p < 0.05$). This suggests that higher green lending is associated with lower credit risk.

2. The green loan ratio was positively correlated with the efficiency ratio for UK banks ($r = 0.68$, $p < 0.05$) and Indian banks ($r = 0.59$, $p < 0.05$). This indicates that banks with higher green lending tend to be more efficient.

3. The green loan ratio of UK and Indian banks were negatively correlated with the leverage ratio to achieve statistical significance under 5% level, $r = -0.61$ and $r = -0.48$, respectively, $p < 0.05$ It implies a higher green lending ratio of banks mitigates their reliance on borrowing funds.

These results analyzed the correlations among green lending, credit risk management, and efficiency and leverage among the banking sectors of UK and India.

Generalized Linear Model (GLM) Regression Analysis

A GLM regression analysis was then conducted to identify the determinants of green lending and of credit risk by banks. The dependent variables were the amount of green loans provided by banks and credit risk measures, which included seven new variables outlined earlier. Factors used in the analysis were the log of the total assets of a bank, the bank efficiency ratio, the bank leverage ratio, the bank loan loss provision, the bank tier 1 capital ratio, the bank loan rate, and the country dummies of UK. A GLM regression analysis was used thereby. By taking the green loans and the credit risk measures as dependent variables, the following results were produced, which presented certain key findings. The GLM regression analysis results showed that:

1. For UK banks, while the effect of the efficiency ratio was ## 0.72, $p < 0.01$ and tier 1 capital ratio ; ## 0.51, $p < 0.05$ was significant positively related to green lending; the leverage ratio ##-0.39, $p < 0.05$ was a significant negatively related to green lending.

2. The two were not significant for Indian commercial banks. Regarding the Credit Risk measures, the relative effects of efficiency ratio ### -0.61, $p < 0.01$ and tier 1 capital ratio ### -0.48, $p > 0.05$ were significantly, negatively related to the credit risk. The leverage ratio ##0.32, $p > 0.05$ was significant positively related to the credit risk.

3. These results shed light on the factors influencing the Credit risk management and green lending activities of the two countries' banking system and highlight the role of capital adequacy, efficiency, leverage, loan loss provisions, and loan rates.

ISSN PRINT 2319 1775 Online 2320 7876
 UGC CARE Listed (Group -I) Journal Volume 11, Iss 12, 2022

4. In summary, our data analysis covers every objective set, and several statistical techniques are applied to grant a detailed discussion of the relationships between Green lending policies, Credit risk measures, and bank Performance indicators in the UK and Indian Banking sectors.

UK Banks:

- The GLM model explained 96.8% of the variance in UK banks' green loan amounts, indicating the selected financial indicators have substantial predictive power for green lending practices.

- However, none of the financial indicators (efficiency ratio, leverage ratio, loan loss provision, funding cost, Tier 1 capital ratio, and loan rate) had a statistically significant effect on green loan amounts at the 0.05 level.

- The negative coefficients for loan loss provisions and Tier 1 capital ratio, although not significant, hint at potential trade-offs between green lending and traditional risk management practices in UK banks.

Private Banks (PB) in India:

- The GLM model explained 83.3% of the variance in PB banks' green loan amounts.

- None of the financial indicators (efficiency ratio, leverage ratio, loan loss provision, Tier 1 capital ratio, loan rate, log of total assets) had a statistically significant effect on green loan amounts at the 0.05 level.

- The lack of significant relationships suggests PB banks' green lending practices in India may be driven more by reputational considerations and stakeholder pressures than immediate financial performance metrics.

For credit risk, the GLM model explained 99.3% of the variance. Only loan loss provision had a statistically significant positive effect on credit risk at the 0.05 level, aligning with the importance of adequate provisioning in managing credit risk.

Public Sector Banks (PS) in India:

- The GLM model explained 96.4% of the variance in PS banks' green loan amounts.

- Log of total assets, loan loss provision, efficiency ratio, credit risk, and loan rate had statistically significant effects on green loan amounts at the 0.05 level.

- Larger PS banks with more assets may have greater capacity to engage in green lending. The negative coefficient for loan loss provisions hints at trade-offs between green lending and risk management.

- For credit risk, the GLM model explained 99.3% of the variance. Similar to PB banks, only loan loss provision had a significant positive effect on credit risk, highlighting its importance in credit risk management for PS banks as well.

In conclusion, the regression analyses highlight the intricate relationships defining green lending and credit risk management factors within banking sectors in the UK and India. These models are highly explanatory in terms of variance; the individual financial indicators' significance is highly contextual and dependent on the bank type. Additional research that includes the above mentioned, as well as environmental regulation, sustainability strategies, and macroeconomic circumstances, will offer a more integrative analysis of green lending and credit risk determinants.

Limitations and Scope for Future Work

The size of the sample, data validity and availability and certain methodological constraints served as limitations. The limitations were analyzed in terms of their potential impact on the generalizability and reliability of the findings of the study.

The future research direction was suggested to outline potential venues for the further inquiries. The role of the regulatory framework, corporate governance measures and risk management tools were demarcated as the areas of focus to determine their role on green lending adoption and the involvement in the credit risk management process. More extensive studies in terms of the research design and the longitudinal method covering more banks and countries were recommended to develop a complete picture of the correlation between green lending and credit risk management in the global banking industry.

Conclusion

This empirical research explored the impact of green lending policies on credit risk management. More specifically, the study investigated selected Indian and UK banks' green lending policy frameworks and practices and compared them to a quantitative model highlighting differences. The differences between banking industries in the two countries became pronounced when measuring the core financial performance indicators. The UK's more significant green loan ratio confirmed the presence of a more advanced approach to green finance in the banks.

The research findings identified the influence of institutional factors, regulatory environment, and various risk factors on green lending and credit possibilities. The correlation analysis demonstrated a positive correlation between high green lending and low credit risk and high efficiency in UK and Indian banking. The dominance analysis using generalized linear model

regression has found that efficiency ratio, leverage ratio, Tier 1 capital ratio, loan loss provisions, and loan rates from saving, correlate with green lending and credit risk. However, UK and Indian banks displayed differences in the indicators. The findings will contribute to the current initiative, as follows. They specifically suggest ways to help authorities, supervisor, and banking institutions to create efficient policies and frameworks for their contexts. Additionally, the study will inform the growing body of knowledge related to the developing prevalence of green lending and sustainability in the banking sector. This study has limitations such as a small sample size and several measurements, as well as potential data availability problems.

For additional studies, recommend incorporating indicators related to regulatory frameworks and diversity of data collected from various countries and several banks. A more extensive examination of regulatory factors, managerial frameworks, and country-level trajectories across several countries and banks will determine how the research generated in this study can be used to further create a comprehensive understanding.

REFERENCE

1. Bahl, S. (2012). Green banking-The new strategic imperative. Asian Journal of Research in Business Economics and Management, 2(2), 176-185.
2. Biswas, N. (2021). Green banking practices and sustainable development: A case of Indian banking sector. International Journal of Business and Management, 9(2), 1-12. https://doi.org/10.5539/ijbm.v9n2p1[1]
3. Broderick, S. (2017). The role of regulation in promoting green lending in the UK banking sector. Journal of Sustainable Finance & Investment, 7(3), 243-256. https://doi.org/10.1080/20430795.2017.1318040[1]
4. Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). SAGE Publications.
5. Dobson, A. J., & Barnett, A. G. (2008). An introduction to generalized linear models (3rd ed.). Chapman and Hall/CRC.
6. Field, A. (2018). Discovering statistics using IBM SPSS statistics (5th ed.). SAGE Publications.
7. Hao, X., Liao, X., & Yang, X. (2019). The impact of green credit on credit risk: Evidence from China's banking sector. Sustainability, 11(23), 6793. https://doi.org/10.3390/su11236793
8. Howell, D. C. (2012). Statistical methods for psychology (8th ed.). Cengage Learning.
9. Jha, N., & Bhome, S. (2016). A study of green banking trends in India. International Journal of Research in Management & Technology, 5(2), 127-132.
10. Zengwei, L., Lian, Y., & Cui, Y. (2020). Green credit, credit risk, and bank performance: Evidence from China. Sustainability, 12(15), 6116. https://doi.org/10.3390/su12156116