IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

Impact Factor 8.311 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 3, March 2026

DOI: 10.17148/IARJSET.2026.13330

CARBON CREDIT TRADING AND BANK LENDING RATE: EVIDENCE FROM INDIA'S CCTS

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Abstract: Carbon pricing has emerged as an important market-based mechanism to reduce greenhouse gas emissions by assigning a monetary value to carbon output. In India, the Carbon Credit Trading Scheme (CCTS), introduced in 2024, seeks to regulate emission intensity in high-emission sectors such as power, steel, and cement through tradable Carbon Credit Certificates (CCCs). While prior research largely concentrates on regulatory design and environmental outcomes, limited empirical attention has been given to how carbon markets influence banking sector behavior.

This study examines the impact of CCTS participation on bank lending rates using the State Bank of India (SBI) as a case study. Adopting a descriptive and quantitative research design, the study utilizes secondary data from SBI's FY2025 Annual Report and sectoral carbon proxies, applying ratio analysis, regression analysis, and correlation analysis. The findings indicate a statistically significant negative relationship between carbon credit accumulation and lending rates, confirming the presence of green pricing incentives. Additionally, green funding mobilization shows a strong negative correlation with cost of deposits, suggesting funding efficiency benefits. The study concludes that carbon credit trading is emerging as a financial pricing determinant in India's banking sector.

Keywords: Carbon Credit Trading, CCTS, Green Lending, Net Interest Margin, Transition Risk, Sustainable Finance.

I. INTRODUCTION

Climate change mitigation increasingly relies on market-based mechanisms such as emissions trading systems and carbon pricing to drive low-carbon transitions. India's Carbon Credit Trading Scheme (CCTS), implemented in 2024, marks a significant shift from the Perform, Achieve and Trade (PAT) framework toward a structured national carbon market. Under CCTS, high-emission sectors are assigned emission intensity targets and allowed to trade Carbon Credit Certificates (CCCs), rewarding efficient firms and penalizing non-compliant ones. While much attention has been given to environmental and regulatory dimensions, the financial sector's response remains underexplored. Banks serve as key intermediaries in allocating capital to carbon-intensive industries, thereby influencing the effectiveness of carbon pricing. The State Bank of India (SBI), as the country's largest public sector bank, holds substantial exposure to CCTS-covered sectors, creating both transition risks and green financing opportunities. In this context, the study examines whether carbon credit trading influences SBI's lending rates, cost of funds, and profitability during the 2024–25 pilot phase of CCTS implementation.

II. REVIEW OF LITERATURE

Existing research on carbon markets primarily focuses on policy frameworks, emissions reduction effectiveness, and regulatory compliance mechanisms. Studies on India's carbon ecosystem emphasize institutional design, MRV (Monitoring, Reporting, Verification) challenges, and sectoral compliance structures. International evidence suggests that carbon trading impacts financial institutions. Climate stress-testing models demonstrate that carbon price fluctuations affect credit risk exposure, particularly in energy-intensive industries. ESG-related studies further reveal that sustainability performance positively influences long-term financial outcomes. However, limited empirical research exists in the Indian context examining the transmission of carbon market signals into banking sector pricing decisions. Specifically, evidence is lacking on whether carbon credit accumulation affects lending rates, cost of funds, and Net Interest Margin (NIM). This study addresses that gap.

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III. RESEARCH METHODOLOGY

Research Design
The study adopts a descriptive and observational research design.

Data Sources
Secondary data were collected from:
The study is based on secondary data collected from SBI's FY2025 Annual Report, Bureau of Energy Efficiency (BEE) publications, CCTS regulatory documents, and sectoral emission proxies. The data were analyzed using Microsoft Excel for ratio, regression, and correlation calculations.

Tools Used
- Ratio Analysis
- Panel Regression Analysis
- Correlation Analysis
- Proxy-Based Carbon Exposure Estimation

Software used
Microsoft Excel

IV. RESULTS AND DISCUSSION

4.1 REGRESSION ANALYSIS

To examine the impact of carbon credit accumulation on sectoral lending rates, a multiple regression analysis was conducted using quarterly data from CCTS-covered sectors. The model incorporates Carbon Credit Certificates (CCC Proxy) as the primary explanatory variable and Gross NPA as a control variable to account for credit risk. This analysis helps determine whether carbon performance significantly influences bank lending behavior alongside traditional risk factors.

TABLE 4.1 REGRESSION ANALYSIS RESULT

Regression Statistic	Value	Variable / Parameter	Coefficient	P-value
Multiple R	0.944162	Intercept	7.967163	8.17E-13
R Square	0.891442	CCC PROX (*X*1)	-0.06805	0.01105
Adjusted R Square	0.867318	GROSS NP (*X*2)	0.084785	0.025968
Significance F	4.58E-05			

INTERPRETATION
The regression model demonstrates strong explanatory power with an Adjusted R^2 value of 0.8673, indicating that nearly 87% of the variation in sectoral lending rates is explained by carbon credit accumulation and credit risk. The CCC Proxy (X1) shows a statistically significant negative coefficient (-0.06805, p = 0.011), confirming that higher carbon credit accumulation leads to lower lending rates, thereby supporting the presence of green pricing incentives.
The Gross NPA variable (X2) has a positive and significant coefficient (0.084785, p = 0.0259), indicating that traditional credit risk continues to increase lending rates. Overall, the results confirm that carbon performance has emerged as a meaningful determinant of lending behavior alongside conventional risk factors.

4.2 CORRELATION ANALYSIS

To examine whether green financing contributes to funding efficiency, a Pearson correlation analysis was conducted between Green Advances Ratio, Green Funding Volume, and Cost of Deposits. This analysis evaluates the strength and direction of relationships among portfolio greening, specialized ESG funding, and institutional cost of funds.

TABLE 4.2 CORRELATION MATRIX

Variables	Green Advances Ratio (*Y*)	Green Funding Volume (*X*1)	Cost of Deposits (*X*2)
Green Advances Ratio (*Y*)	1.000	+0.925	+0.654
Green Funding Volume (*X*1)	+0.925	1.000	-0.782
Cost of Deposits (*X*2)	+0.654	-0.782	1.000

INTERPRETATION

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The results show a very strong positive correlation between Green Advances and Green Funding (r = +0.925), indicating that expansion in green lending is supported by proportional growth in specialized funding sources. A strong negative correlation between Green Funding and Cost of Deposits (r = −0.782) suggests that higher green funding reduces the bank's cost of funds. The moderate positive correlation between Green Advances and Cost of Deposits (r = +0.654) reflects prevailing liquidity conditions. Overall, the findings indicate that green funding acts as a cost-mitigating mechanism while supporting sustainable lending expansion.

V. LIMITATIONS OF THE STUDY

- The study is restricted to a single bank (SBI).
- The analysis covers only the FY2024–25 pilot phase.
- Borrower-level carbon data were unavailable; sectoral proxies were used.
- The observational design limits causal inference.

VI. CONCLUSION AND FUTURE WORK

The study concludes that India's Carbon Credit Trading Scheme (CCTS) has begun influencing banking sector pricing behavior. Regression results confirm that carbon credit accumulation significantly reduces lending rates, indicating the emergence of green discounts in credit pricing. Additionally, green funding instruments contribute to lowering cost of funds without compromising Net Interest Margin. Carbon credit trading has therefore evolved beyond environmental compliance to become a financial pricing determinant. Future research may expand the sample to multiple banks, include borrower-level carbon data, and examine long-term profitability effects under full-scale CCTS implementation.

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