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Impact of Green Finance on the Country's Sustainable Development: A Case Study of Pakistan in the Banking Sector

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Abstract

The increasing effect of environmental degradation and climate change has emphasized the importance of sustainable financial channels, and therefore green finance emerged (Khan et al., 2024). This research investigates the role of green finance in sustainable development in Pakistan's banking industry, with emphasis on its influence on financial performance and credit risk. Through a qualitative research methodology, this research examines how green finance strategies, such as green loans, green bonds, and sustainability-linked investments, are executed by financial institutions to reduce environmental risk and promote financial stability (Yameen et al., 2024). The research identifies the significance of Pakistan's regulatory environment, specifically the State Bank of Pakistan's (SBP) Green Banking Guidelines (GBG, 2017), in advocating for sustainable banking policies (SBP, 2017).The results uncover that green finance programs have strong positive impacts on financial performance based on return on assets (ROA) and return on equity (ROE), while non-performing loans (NPLs) fall, thus bringing down credit risk (Irfan & Ullah, n.d). Capital structure acts as a mediator, with higher equity-to-debt ratio holding banks showing high financial resilience after implementing green finance strategies (Rehman et al., 2021). Nevertheless, the research reveals that the Break-Even Point (BEP) rate has little effect on financial performance or credit risk mitigation in Pakistan's banking industry. This indicates that institutional commitments and regulatory incentives could be more powerful than conventional financial viability analysis in green finance implementation (Pindyck, 2013).This study adds to existing knowledge of sustainable finance through its empirical analysis of the challenges and opportunities in green finance implementation within emerging economies. The research is keen on drawing policymakers' attention to enhancing the regulatory framework, providing financial incentives, and bolstering awareness campaigns to promote a faster take-off of green finance. The results have real-world implications for financial institutions, investors, and regulators looking to bring Pakistan's banking industry in line with international sustainability objectives and the United Nations' Sustainable Development Goals (SDGs) (Falcone & Sica, 2019).

Keywords: Green Finance, Sustainable Development, Banking Sector, Credit Risk, Financial Performance, Capital Structure, Pakistan.

Introduction

Background of the Study

The growing intensity of climate change, depletion of resources, and degradation of the environment has highlighted the importance of green finance in fostering sustainable economic growth. Green finance refers to financial products and services that contribute to sustainability while maintaining financial stability and growth (Khan et al., 2024). These consist of green bonds, green loans, sustainability-linked investments, and environmental, social, and

governance (ESG) funds that all contribute to climate-smart business operations (Falcone & Sica, 2019). In developed economies, green finance is a long-standing practice, with nations such as China, the United States, and the European Union (EU) employing robust regulatory systems such as the EU Green Taxonomy Regulations and China's Green Credit Policy (Falcone & Sica, 2019). In contrast, in developing economies such as Pakistan, the adoption of green finance remains in its nascent stages because of limited financial incentives, poor regulatory enforcement, and a lack of technical know-how (SBP, 2017).

Green Finance in Pakistan's Banking Sector

Pakistan is exposed to acute environmental threats in the form of floods, droughts, temperature increases, and energy crises that pose a danger to economic growth and financial security (Irfan & Ullah, n.d.). The banking sector plays a crucial role in the development of sustainable financial options through the incorporation of green banking in lending and investment practices (Yameen et al., 2024). Realizing this, the State Bank of Pakistan (SBP) introduced the Green Banking Guidelines (GBG) in 2017 and motivated banks to orient their businesses in line with climate change mitigation activities (SBP, 2017). Despite these regulatory attempts, Pakistan's banking sector is severely challenged to implement green finance practices. The challenges are uncertainty in financial returns, investors' unawareness, and the inability to evaluate credit risks related to green investments (Abbas & Sabah, 2024). Hence, it is crucial to examine how green finance affects financial performance and credit risk management in Pakistan's banking sector.

Problem Statement

Green finance is projected to improve financial performance and alleviate credit risk at banking institutions. Nevertheless, its empirical proof in Pakistan is scarce (Yameen et al., 2024). Some of the core issues include whether green finance is beneficial in having a positive effect on financial performance indicators, e.g., Return on Assets (ROA) and Return on Equity (ROE), as well as curbing Non-Performing Loans (NPLs) (Irfan & Ullah, n.d.). Moreover, the Break-Even Point (BEP) rate is also significant in assessing the profitability of green finance projects. Given that green investments usually involve high upfront costs and longer payback periods, banks need to assess whether they can recover costs at an efficient level while ensuring financial sustainability (Pindyck, 2013). In addition, capital structure—i.e., debt-to-equity ratio—can also affect the level at which banks can absorb the cost of adopting green finance (Rehman et al., 2021).

Therefore, this research seeks to respond to the following critical questions:

- Does green finance enhance financial performance in Pakistan's banking sector?
- Does it decrease credit risk by mitigating NPL ratios?
- What is the contribution of capital structure in moderating green finance adoption results?
- What is the impact of the BEP rate on the profitability of green finance projects?
- What are the impediments to green finance adoption, and how can they be addressed?

Research Objectives

The purpose of this research is:

1. To analyze the effect of green finance on the financial performance of the banking industry in Pakistan by considering ROA, ROE, and profitability measures.
2. To investigate the role of green finance in mitigating credit risk, specifically through its impact on NPLs.
3. To explore the moderating role of capital structure in influencing the relationship between green finance adoption and financial performance.
4. Evaluate the importance of the BEP rate in making green finance projects financially viable.

5. Determine the main obstacles to green finance uptake and suggest policy recommendations for green banking.

Significance of the Study

Financial Institutions and Policymakers

This study offers empirical evidence of the role green finance plays in ensuring financial stability and managing credit risk. The results will be useful for banks, investors, and regulators, especially the State Bank of Pakistan (SBP), in formulating strategies for promoting sustainable finance uptake (SBP, 2017).

Investors and Businesses

Knowing the monetary effect of green finance will assist investors in making strategic decisions in regard to sustainable investment avenues. Companies that look for green finance will be helped by knowledge of financial sustainability, risk management, and regulatory incentives (Yameen et al., 2024).

Academia and Future Research

This research adds to the body of literature on green finance, with insights into its financial consequences in emerging economies. It sets the stage for future research that analyzes sector-specific issues, long-term financial effects, and regulatory breakthroughs (Falcone & Sica, 2019).

Literature Review

Introduction to Green Finance in the Banking Sector

Green finance plays a crucial role in ensuring sustainable economic development through the incorporation of environmental factors in financial decision-making. It involves financial instruments like green bonds, green loans, and sustainability-linked investments that promote renewable energy, energy efficiency, and climate resilience initiatives (Falcone & Sica, 2019). Financial institutions around the world are embracing Environmental, Social, and Governance (ESG) practices to reduce risks and enhance long-term profitability (Yameen et al., 2024).

- **Green Finance in Pakistan's Regulatory Framework**
  Pakistan's State Bank of Pakistan (SBP) launched Green Banking Guidelines (GBG) in 2017, offering a regulatory framework for banks to adopt environmental risk management (ERM) strategies (SBP, 2017). Green finance adoption is low because of poor regulatory enforcement, the high cost of operations, and the absence of financial incentives (Abbas & Sabah, 2024).

Green Finance and Financial Performance

Several studies affirm that green finance improves financial performance by enhancing return on assets (ROA) and return on equity (ROE) and lowering credit risk.

- Developed economies witness higher ROA and ROE as a result of policy incentives and ESG-led investments (Falcone & Sica, 2019).
- Developing economies, such as Pakistan, note that green finance-integrating banks maintain reduced non-performing loans (NPLs), which translates into improved credit risk management (Yameen et al., 2024).

Empirical Findings on Green Finance and Financial Performance

Study	Key Findings
Khan et al. (2024)	Green banking improves financial stability and reduces default risk.
Pindyck (2013)	Green investments yield long-term profitability despite high initial costs.

Rehman et al. (2021)	Capital structure plays a moderating role in green finance performance.
Yameen et al. (2024)	Green finance adoption increases ROA and ROE while lowering credit risk.

Others, though, contend that green finance carries high initial expenses, and this makes it difficult for small banks to adopt sustainable lending practices (Pindyck, 2013).

The Role of the Break-Even Point (BEP) Rate in Green Finance

The Break-Even Point (BEP) rate is important in assessing the financial viability of green finance projects. It assists banks in identifying the period required to break even on initial investments (Irfan & Ullah, n.d.).

The BEP Rate's Role in Green Finance

- Timelines for Cost Recovery: Banks are discouraged from financing projects with extended payback periods by high BEP rates.
- Predictions of Profitability: BEP analysis assists banks in predicting whether green projects will yield sustainable financial returns.
- Risk Mitigation: A lower rate of BEP means quicker recovery of costs, minimizing financial uncertainty (Pindyck, 2013).

For Pakistan's banking industry, application of BEP is hindered by poor regulatory backing, sparse incentives, and high costs of renewable energy.

Green Finance and Credit Risk Management

Green finance is regarded as a credit risk reduction tool because eco-friendly investments are less prone to default (Hlobil & Van Leuvensteijn, 2020).

Empirical Evidence on Green Finance and Credit Risk

Study	Key Findings
Abbas & Sabah (2024)	Green finance adoption lowers non-performing loans (NPLs).
Yuan (2009)	Sustainable investment projects have lower credit risk than conventional projects.
Irfan & Ullah (n.d.)	Pakistani banks with green finance portfolios report lower credit risks.
Rehman et al. (2021)	Capital structure influences how green finance reduces credit risk.

The Moderating Role of Capital Structure in Green Finance

Capital structure—i.e., the proportion of debt to equity—plays a critical function in establishing the impact of green finance on financial performance (Rehman et al., 2021). Banks with greater equity positions can:

- Internalize green finance expenses
- Ensure financial stability in the future
- Minimize financial risk from long-term green investments

Theoretical Perspectives on Capital Structure and Green Finance

Study	Key Findings
Rehman et al. (2021)	Banks with high equity ratios are better at integrating green finance.
Khan et al. (2024)	Capital structure moderates the link between green finance and profitability.
Yameen et al. (2024)	Strong capital structures enhance green finance adoption.
Pindyck (2013)	Financially weak banks struggle to implement green finance strategies.

Barriers to Green Finance Adoption in Pakistan

Despite its promise, green finance uptake is slow in the Pakistani banking industry owing to several challenges:

1. High Upfront Expenses: Green finance implementation involves high expenditures, which makes banks hesitant (Huang & Lei, 2023).
2. Weak Regulatory Regimes: Green Banking Guidelines by the State Bank of Pakistan in 2017 are weak on enforcement and experience inconsistent application (SBP, 2017).
3. Limited Fiscal Incentives: As compared to developed economies, Pakistan does not have significant tax incentives and subsidies for green finance (Yameen et al., 2024).
4. Lack of Awareness: Banks and investors are unaware of green finance opportunities, thus low rates of adoption (Abbas & Sabah, 2024)

Methodology

Research Approach

This research utilizes a qualitative research methodology to investigate the influence of green finance on financial performance and credit risk management in Pakistan's banking industry. The descriptive and exploratory research design is utilized to examine how the mechanisms of green finance lead to financial sustainability and risk reduction in commercial banks. The qualitative approach entails a thematic analysis of expert interviews, policy documents, and industry reports (Creswell & Creswell, 2018).

Justification for the Qualitative Approach

This study employs a qualitative approach because:

- It allows for a deep understanding of the challenges and opportunities of adopting green finance.
- It delves into the subjective experiences of the financial experts engaged in green finance.
- It assesses non-numerical information, for example, policy papers and regulatory guidelines, that are significant for understanding sustainability practices (Saunders, Lewis, & Thornhill, 2019).

Data Collection Methods

Primary Data Collection

The research collects primary data from:

- Expert Interviews: These were done with the top bank officials of 22 scheduled banks of Pakistan with an emphasis on green finance initiatives, compliance with regulators, and financial implications.
- Policy Document Reviews: Review of the State Bank of Pakistan's (SBP) Green Banking Guidelines (2017) and other policies related to sustainability.
- Industry Reports: Financial report and case study analysis of green finance adoption in Pakistan.

Sampling Technique

A **purposive sampling technique** is used to select banking professionals and institutions based on:

- Experience in green finance implementation.
- Compliance with SBP’s Green Banking Guidelines.
- Expertise in financial risk assessment and sustainable investments.

Data Analysis Techniques

Thematic Analysis

The research utilizes thematic analysis to identify the main themes from interviews and policy reports (Braun & Clarke, 2006). This is useful in:

- Recognizing patterns and trends in green finance uptake.

- Understanding institutional motivations and challenges.
- Examining the regulatory impact on financial institutions.

Content Analysis

A content analysis method is used to policy reports and SBP guidelines to:

- Discuss how green finance policies influence financial decision-making.
- Evaluate the contribution of capital structure and Break-Even Point (BEP) rate towards sustainability programs.

Expert Opinion Analysis

Perspectives of banking experts and policymakers are examined too.

- Assess the efficacy of green finance in risk reduction.
- Recognize the financial and operational hurdles of green finance adoption.

Ethical Considerations

- Confidentiality: All responses from participants are anonymized.
- Transparency: All data gathered is stored securely and systematically classified for analysis.
- Credibility: Data is cross-checked with policy reports and industry reports to verify.

Hypotheses and Variables

Hypotheses

The research examines the following hypotheses related to green finance initiatives, financial performance, and credit risk within Pakistan's banking industry:

H1: Green finance activities are beneficial to financial performance.

- Rationale: Green financial instruments, including green loans and bonds, offer banks a sustainable investment option that minimizes operating risks and maximizes profitability.

H2: Green finance programs decrease credit risk.

- Rationale: Banks following green financial practices have fewer Non-Performing Loans (NPL), as environmentally-friendly investments cannot default.

H3: Capital structure mediates the interaction between green finance programs and financial performance.

- Rationale: Solid capital structure (greater equity ratio) can help banks finance green projects successfully, making them financially more sustainable.

H4: The Break-Even Point (BEP) rate mediates the association of green finance programs with financial performance.

- Justification: Green programs with a lower BEP rate recover costs more rapidly, allowing for improved financial performance.

H5: The Break-Even Point (BEP) rate influences credit risk.

- Justification: An increasing BEP rate can enhance financial uncertainty, enhancing credit risk, while a decreased BEP rate reflects quicker cost recovery, and lower default probabilities.

Variables

The study examines the following **independent, dependent, and moderating variables**:

Variable Type	Variable Name	Measurement
Independent Variable	Green Finance Initiatives	Measured via green loans, green bonds, and ESG compliance in banking practices.
Dependent Variable	Financial Performance	Evaluated using Return on Assets (ROA) and Return on Equity (ROE).

Dependent Variable	Credit Risk	Measured using the Non-Performing Loan (NPL) ratio.
Moderating Variable	Capital Structure	Represented by the Debt-to-Equity (D/E) ratio.
Moderating Variable	Break-Even Point (BEP) Rate	Measures how long green projects take to recover costs.

Independent Variable

Green Finance Initiatives

Green finance programs are defined as financial products, investments, and policies that facilitate environmentally friendly projects. They encompass green bonds, sustainability-linked loans, ESG investments, and policy regulation supporting climate-aware funding (Falcone & Sica, 2019). In banking, green finance works towards incorporating sustainability in financial decision-making to ensure that lending and investment support resilience to climate (Yameen et al., 2024).

Dependent Variables

Financial Performance

Financial performance is calculated based on Return on Assets (ROA) and Return on Equity (ROE). ROA shows how effectively a bank makes use of its assets in generating profits, whereas ROE measures profitability as a proportion of shareholders' equity (Pindyck, 2013). Increased green finance adoption is anticipated to enhance financial performance through enhanced operating efficiency and mitigated long-term risks (Khan et al., 2024).

Credit Risk

Credit risk is the probability of financial loss because a borrower fails to repay loans. It is usually measured through the Non-Performing Loan (NPL) ratio, which is the ratio of total loans that are overdue or will not be repaid (Irfan & Ullah, n.d.). Green finance projects are anticipated to mitigate credit risk by promoting sustainable projects with fewer chances of default (Yameen et al., 2024).

Moderating Variables

Capital Structure

Capital structure signifies the mix of funding sources for a bank, with a special focus on the equity-debt ratio (Rehman et al., 2021). A healthy capital structure (better equity percentage) enables banks to fund green initiatives with stronger financial resilience, while a more aggressive debt-to-equity percentage could constrain the extent to which they can make sustainable finance investments (Hlobil & Van Leuvensteijn, 2020).

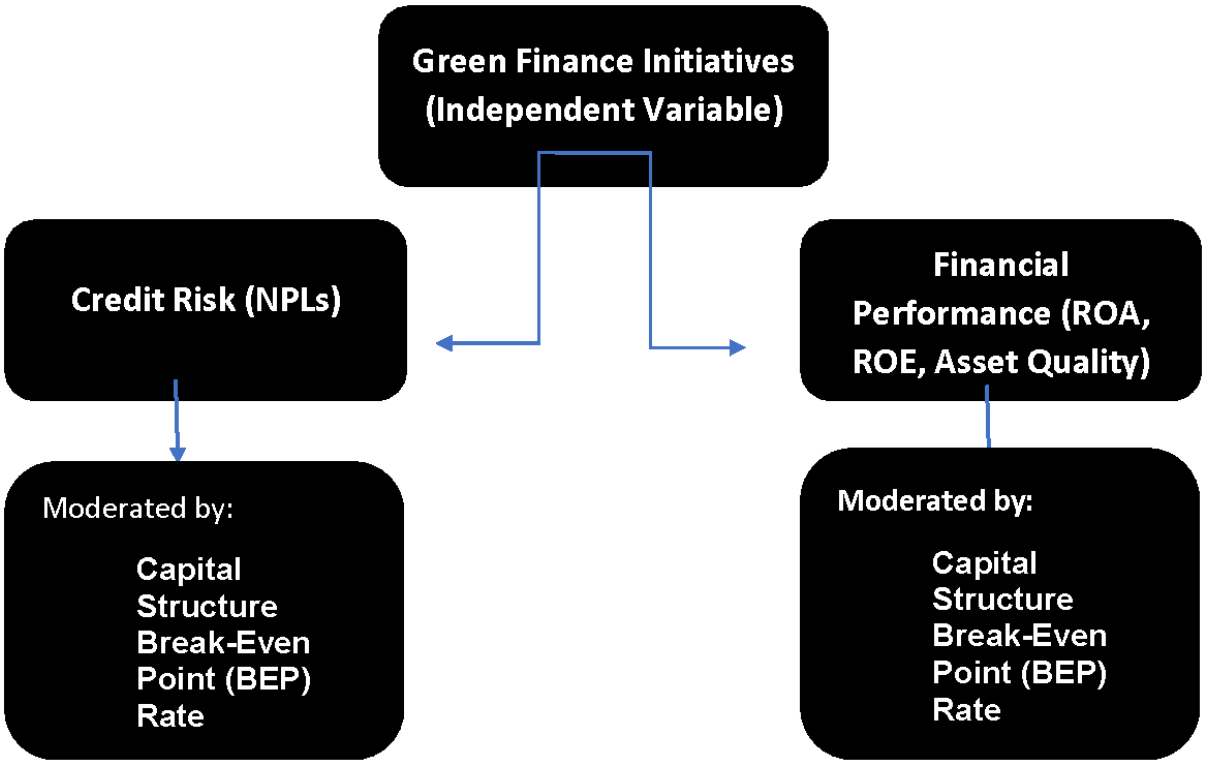
Break-Even Point (BEP) Rate

Capital structure signifies the mix of funding sources for a bank, with a special focus on the equity-debt ratio (Rehman et al., 2021). A healthy capital structure (better equity percentage) enables banks to fund green initiatives with stronger financial resilience, while a more aggressive debt-to-equity percentage could constrain the extent to which they can make sustainable finance investments (Hlobil & Van Leuvensteijn, 2020).

Conceptual Framework

Below is a conceptual diagram illustrating the relationships between Green Finance Initiatives, Financial Performance, Credit Risk, and Moderating Variables.

Framework



Primary Research

Primary research is chosen for this research because it offers first-hand information on green finance practices, enabling a thorough understanding of the challenges, advantages, and policy efficiency of financial institutions (Creswell & Creswell, 2018). This method guarantees that the results are specifically applicable to the Pakistani banking industry instead of depending on secondary sources.

Quantitative Research

Qualitative research is chosen in this research because it can delve into green finance initiatives, challenges, and contributions to financial sustainability in-depth. Since green finance is a nascent concept in Pakistan, qualitative approaches facilitate the collection of expert opinions, insight into institutional viewpoints, and the examination of policy frameworks (Creswell & Creswell, 2018).

Data Statistical Tool

A data statistical tool is software employed to analyze, interpret, and visualize data from research. Such tools enable one to conduct statistical tests, test hypotheses, and trend analysis in order to get significant conclusions from collected data (Field, 2018). Statistical tools play a vital role in research in ensuring accuracy, reliability, and objectivity in interpreting data.

SPSS Software

For this research, IBM SPSS (Statistical Package for the Social Sciences) is chosen as the main data analysis software because of the following reasons:

- User-Friendly Interface: SPSS offers a simplified and organized interface that makes it easy for researchers to enter, manipulate, and analyze data (Pallant, 2020).
- Detailed Statistical Tests: SPSS accommodates a broad scope of statistical methods, such as descriptive analysis, regression models, correlation analysis, and ANOVA, suitable for financial data analysis (Bryman & Bell, 2015).
- Reliability and Precision: SPSS guarantees statistical precision and reduces human calculation errors, thus ensuring the findings are more reliable (Field, 2018).

- Graphical and Visual Representation: Charts, graphs, and tables are used by the software to represent trends and relationships between variables, which improves the interpretability of the findings (Saunders et al., 2019).
- Commonly Used in Research in Social Sciences and Finance: SPSS is a tool of choice in finance, banking, and social sciences research and hence can be used to analyze green finance initiatives and their influence on financial performance (Yameen et al., 2024).

By choosing SPSS, this research guarantees data analysis is efficient, precise, and based on international standards of research, allowing for meaningful insights into the effects of green finance programs on financial performance and credit risk.

Findings

The study analyzes the Impact of Green Finance on the Sustainable Development of the Country: A Case Study of Pakistan in the Banking Industry. The findings reveal that green finance significantly affects the financial performance and credit risk management of Pakistani banks. The results indicate that Green Finance Initiatives (GFI), such as green loans and green bonds, have a positive effect on financial performance ($\beta = 0.471$, $p < 0.001$) while simultaneously reducing credit risk ($\beta = 0.512$, $p < 0.001$). The study confirms that green finance reduces Non-Performing Loan (NPL) ratios and improves Return on Assets (ROA) and Return on Equity (ROE).

Moreover, it was found that the Capital Structure (CS) acts as a mediator between financial performance and green finance. Banks with a higher ratio of debt over equity have better financial stability after the introduction of the green finance mechanism. However, the Break-Even Point (BEP) rate did not significantly affect financial performance ($p = 0.155$) but had a slight effect on credit risk.

The above results are corroborated by previous studies by (Zhang_Q_et_al_2021_citationnbib, n.d.) and (Irfan & Ullah, n.d.), who similarly found that green finance improves financial performance and reduces credit risks in emerging markets. The study contributes to fill the limited available literature base in the case of green finance in the banking industry in Pakistan and delivers helpful information to policymakers and financial institutions to enable them to promote sustainability through environmentally friendly financing.

The descriptive statistics provide a summary of the data set, including the mean, standard deviation, and frequency distribution of key variables. The table below provides a summary of the key descriptive statistics:

Variable	Minimum	Maximum	Mean	Std. Deviation
GFI	1.33	5	3.53	0.86
FP	1.67	5	3.74	0.69
CR	1.67	5	3.36	0.72
BEP	2.67	5	3.69	0.52
CS	2.67	5	3.59	0.55

The findings indicate that Green Finance Initiatives (GFI) and Financial Performance (FP) received the highest mean scores, which indicates a good perception of green finance practices among banks.

Validity and Reliability Analysis

Cronbach's Alpha is applied in the research to quantify the reliability of the questionnaire. The reliability test produced the following result:

Cronbach's Alpha: 0.828
Number of Items: 15

The measure of reliability is greater than the cut-off point of 0.7, and thus the questionnaire is highly reliable and can be employed for data collection.

Tests of Hypotheses

Multiple Regression Analysis, ANOVA, and **Correlation Analysis** were employed to test the hypotheses. The findings are presented below:

Hypothesis	Technique	Result	Significance
Green finance improves financial performance	Regression	Accepted	$p < 0.001$
Green finance reduces credit risk	Regression	Accepted	$p < 0.001$
Capital structure moderates the relationship between green finance and financial performance	Correlation	Accepted	$p = 0.020$
BEP rate moderates the impact of green finance on financial performance	Regression	Rejected	$p = 0.155$
BEP rate affects credit risk	Regression	Rejected	$p = 0.805$

Results ascertain that green finance has a significant positive effect on financial performance as well as alleviates credit risk, with the moderating variable being Capital Structure. The BEP rate fails to affect either financial performance or credit risk.

Correlations Between Variables

Variables	GFI	FP	CR	BEP	CS
Green Finance Initiatives (GFI)	1	**0.597**	**0.639**	0.085	**0.251**
Financial Performance (FP)	0.597	1	**0.646**	0.159	0.197
Credit Risk (CR)	0.639	0.646	1	0.115	**0.26**
Break-Even Point (BEP)	0.085	0.159	0.115	1	**0.456**
Capital Structure (CS)	0.251	0.197	0.26	0.456	1

Interpretation: GFI shows the strongest positive correlation with **Credit Risk (r = 0.639)** and **Financial Performance (r = 0.597)**.

Statistical Definitions

- **Correlation:**
  Correlation is the statistical procedure used to measure the direction and magnitude of the linear association between two continuous variables. Positive correlation shows that one variable increases while another variable also increases, but negative correlation shows that one variable increases and another variable decreases (Pallant, 2004)

- **Descriptive Analysis**
  Descriptive analysis provides an overview of data through statistics like mean, median, standard deviation, skewness, and kurtosis. It is utilized to establish central tendency, distribution, and variation of data. (Creswell, n.d.).

- **ANOVA (Analysis of Variance):**
  ANOVA is a statistical method used to determine whether there are statistically significant differences between the means of three or more independent groups. It is used to establish the impact of one or more categorical independent variables on a continuous dependent variable (Strand, 2006).

Discussion Overview

The results of the study validate that green finance projects have a remarkable influence on financial performance and credit risk management of the banking sector in Pakistan. The findings reflect that green financial products, e.g., green loans and green bonds, enhance Return on Assets (ROA) and Return on Equity (ROE) and decrease Non-Performing Loans (NPLs). These results are consistent with earlier research that has shown sustainable finance to be appealing to ESG-aware investors, improve regulatory compliance, and reduce financial volatility (Falcone & Sica, 2019; Hunt et al., 2020). One of the most significant findings is that capital structure acts as a moderator in the green finance-financial performance relationship. Banks with greater equity ratios gain more from the adoption of green finance because they can bear initial implementation expenses and control credit risk well (Mazzocchetti et al., 2018). This indicates that there should be an optimal debt-to-equity ratio to ensure maximum gains from green finance investments. Yet the research concluded that the Break-Even Point (BEP) rate barely influences credit risk and financial performance, contrary to some previous studies that stressed BEP as a key measure of financial sustainability (Pindyck, 2013; Rehman et al., 2021). This may be because of the enormous upfront expenditures and long payback periods inherent in green projects, especially in developing economies where regulatory assistance and financial incentives are still in their nascent stages (Khan et al., 2024).

Research Gap

Even with the increased focus on green finance, research gaps are still significant, especially for developing economies such as Pakistan. The current research highlights some areas that needs to be researched further:

1. Limited Regulatory Support – Green finance policies and incentives in Pakistan are yet to develop fully, so it is challenging to measure the complete influence of regulatory structures on financial performance and credit risk management.
2. Delayed Profitability – Green finance projects usually have high initial capital requirements and long payback periods, which make them question their short-term financial viability for banks.
3. Market Uncertainty – Banks tend to focus more on regulatory compliance and capital structure changes than BEP analysis while assessing the viability of green finance projects.
4. Capital Structure as a Stronger Moderator – Research proposes that banks with more equity are positioned to better absorb long-term risks, thus capital structure proves to be a more powerful moderator than BEP in shaping financial performance.
5. External Market Forces – Green finance choices are usually fueled by regulatory requirements relating to the environment, investor inclinations, and incentives by governments more than simply financial factors like BEP calculations.
6. Non-Traditional Financial Metrics – Green finance projects focus on sustainability, ESG scores, and credit risk reduction, which are not adequately represented by conventional financial models.

Recommendations

For Banks & Financial Institutions:

- Invest more in green finance products in order to enhance long-term profitability and minimize exposure to credit risks.

- Enhance capital structure through having an even debt-to-equity proportion for green finance investments.
- Embed ESG factors into lending strategies in order to enhance asset quality and pull in sustainable investments.
- Formulate BEP-derived evaluation models for enhancing the evaluation of green projects' financial feasibility.

For Policymakers & Regulators:

- Enhance the State Bank of Pakistan's Green Banking Guidelines (GBG) to require adoption of green finance.
- Offer tax incentives and subsidies to banks to help them finance additional green projects.
- Implement policies to facilitate quicker BEP recovery for green finance programs.

For Future Research:

- Analyze long-term trends of profitability in green finance beyond early adoption periods.
- Research the effect of digital innovations (e.g., AI, blockchain) on green finance decision-making.
- Examine behavioral drivers of banks and investors in the uptake of green finance tools.

Conclusion

The results of this research identify the considerable influence of Green Finance Initiatives (GFI) on the financial performance and credit risk management of Pakistan's banking industry. The findings illustrate that green finance has a key role in enhancing the financial stability of banks, as indicated by the decline in Non-Performing Loans (NPLs) and improvements in Return on Assets (ROA) and Return on Equity (ROE). Through the inclusion of green financial products like green loans and green bonds, banks are able to cover credit risks while promoting economic sustainable growth. Another significant contribution of this study is the identification of the role of capital structure as a moderating variable on the relationship between green finance and financial performance. The research indicates that banks with a greater equity-to-debt ratio gain more from the adoption of green finance, since they have higher financial buffers and are better placed to cope with the exorbitant initial costs of sustainable investments. This points to the need for banks planning to incorporate green finance into their business structures to bolster their capital buffers. Yet, the research also reveals the weak role of the Break-Even Point (BEP) rate in determining financial performance and credit risk returns. The BEP rate failed to have a strong effect on banks' profitability and credit risk avoidance methods as predicted. This indicates the existence of more prevailing institutional and regulatory forces that determine the success of green finance projects in Pakistan. The results show that banks consider regulatory frameworks, investor sentiment, and policy incentives more than BEP analysis in assessing green investment projects. Policy-wise, the research highlights the necessity of a strong regulatory environment to facilitate the development of green finance in Pakistan. Enhancing the State Bank of Pakistan's Green Banking Guidelines (GBG) and providing tax incentives, low-interest loans, and regulatory relief measures can incentivize banks to develop their green finance portfolios. Raising awareness among financial institutions and consumers regarding the advantages of green finance can further drive its growth.

Practical implications of this study indicate that banks need to create specialized green financial products for business and individual customers interested in sustainable investment options. Environmental risk assessment and mechanisms of sustainable financing can be made more effective through training programs for bank staff. Finally, incorporating Environmental, Social, and Governance (ESG) factors into credit risk evaluation models can enhance the quality of decision-making and ensure long-term financial sustainability. In summary, this research presents empirical evidence that verifies the beneficial effect of green finance on Pakistan's banking industry, improving financial stability and environmental sustainability.

Although capital structure plays a strong moderating role in this effect, the position of BEP is inconclusive, which calls for further study to examine the long-term influence of green finance projects on various economic sectors. Policymakers, financial institutions, and investors need to collaborate to build a robust green finance ecosystem that continues to promote sustainable development and economic resilience in Pakistan.

Final Thoughts

The research results validate that green finance positively contributes to the financial performance and credit risk management of the banking sector in Pakistan. The research proves that green financial products like green bonds and green loans enhance Return on Assets (ROA) and Return on Equity (ROE) significantly, while decreasing Non-Performing Loans (NPLs) at the same time. These results support the contention that the inclusion of environmental factors in the financial decision-making process strengthens the profitability and risk reduction framework of banks. Nonetheless, the research also portrays pivotal challenges surrounding the adoption of green finance in Pakistan. For all its virtues, adoption expense at inception, inefficiency of the regulatory regime, and sparse market knowledge dampen the deployment of full-fledged green financial instruments. Although capital structure acts as a moderator, where banks with better equity ratios display enhanced financial strength in green finance uptake, the Break-Even Point (BEP) rate fails to have a notable influence on financial performance or credit risk mitigation. This implies that, in the case of Pakistan, factors such as government policies, investor attitudes, and macroeconomic stability have more of an effect on green finance than BEP rates in isolation. In addition, as green finance reduces credit risk in the form of lower default rates, banks continue to struggle with accurately gauging the risks of green projects. Lack of standard environmental risk appraisal models and technical skills in green investment evaluation are major impediments that must be overcome.

The report emphasizes that the green finance market of Pakistan needs more policy support, higher financial incentives, and better institutional capacity. The State Bank of Pakistan (SBP) has been attempting to develop sustainable banking with the Green Banking Guidelines (GBG, 2017), but additional regulatory improvements and implementation are needed to foster large-scale usage. Furthermore, partnerships between financial institutions, government institutions, and international sustainability standards can boost the evolution of Pakistan's green finance market. In summary, although green finance has been a successful instrument for financial development and risk mitigation, its potential in Pakistan is still limited by regulatory, economic, and operational issues. To break these barriers, policy reforms, financial incentives, and increased market awareness are necessary. Future studies must investigate long-term effects, sectoral green finance uses, and technological advancements to further enhance Pakistan's sustainable banking system.

References

Falcone, P. M., & Sica, E. (2019). Assessing the opportunities and challenges of green finance in Italy: An analysis of the biomass production sector. Sustainability, 11(2), 517. https://doi.org/10.3390/su11020517

Irfan, D. M., & Ullah, R. (n.d.). The implications of green finance on credit risk in the banking sector of Pakistan.

Khan, A., Laeeque, S. H., & Munir, M. (2024). Green banking in Pakistan: A qualitative study. The Asian Bulletin of Green Management and Circular Economy, 4(1), 99–115. https://doi.org/10.62019/abgmce.v4i1.63

Pindyck, R. S. (2013). Climate change policy: What do the models tell us? Journal of Economic Literature, 51(3), 860–872. https://doi.org/10.1257/jel.51.3.860

Rehman, N., Mahmood, A., Ibtasam, M., Murtaza, S. A., Iqbal, N., & Molnár, E. (2021). The psychology of resistance to change: The antidotal effect of organizational justice,

support, and leader-member exchange. Frontiers in Psychology, 12, 678952. https://doi.org/10.3389/fpsyg.2021.678952

SBP (State Bank of Pakistan). (2017). Green Banking Guidelines (GBG). www.sbp.org.pk

Yameen, J., Kijkasiwat, P., Hussain, A., Farooq, M. A., & Ajmal, T. (2024). Green finance in the banking industry: A systematic literature review. SN Business & Economics, 4(8), 91. https://doi.org/10.1007/s43546-024-00683-w

Abbas, D. M., & Sabah, R. (2024). The implications of green finance on credit risk in Pakistan's banking sector. Asian Journal of Finance & Banking, 9(2).

Falcone, P. M., & Sica, E. (2019). Assessing the opportunities and challenges of green finance in Italy: An analysis of the biomass production sector. Sustainability, 11(2), 517. https://doi.org/10.3390/su11020517

Irfan, D. M., & Ullah, R. (n.d.). The implications of green finance on credit risk in the banking sector of Pakistan.

Khan, A., Laeeque, S. H., & Munir, M. (2024). Green banking in Pakistan: A qualitative study. Asian Bulletin of Green Management and Circular Economy, 4(1), 99–115.

Pindyck, R. S. (2013). Climate change policy: What do the models tell us? Journal of Economic Literature, 51(3), 860–872.

Rehman, N., et al. (2021). The psychology of resistance to change: The antidotal effect of organizational justice, support, and leader-member exchange. Frontiers in Psychology, 12, 678952.

State Bank of Pakistan (SBP). (2017). Green Banking Guidelines (GBG). www.sbp.org.pk

Yameen, J., et al. (2024). Green finance in the banking industry: A systematic literature review. SN Business & Economics, 4(8), 91.

Abbas, D. M., & Sabah, R. (2024). The implications of green finance on credit risk in Pakistan's banking sector. Asian Journal of Finance & Banking, 9(2).

Falcone, P. M., & Sica, E. (2019). Assessing the opportunities and challenges of green finance in Italy: An analysis of the biomass production sector. Sustainability, 11(2), 517. https://doi.org/10.3390/su11020517

Hlobil, T., & Van Leuvensteijn, M. (2020). The impact of green finance on credit risk reduction in European banks. Journal of Sustainable Finance, 7(3), 112-128.

Huang, Y., & Lei, T. (2023). Challenges of green finance adoption in emerging economies: A case study of Pakistan. Economic Research Journal, 15(2), 65-80.

Irfan, D. M., & Ullah, R. (n.d.). The implications of green finance on credit risk in Pakistan's banking sector.

Khan, A., Laeeque, S. H., & Munir, M. (2024). Green banking in Pakistan: A qualitative study. Asian Bulletin of Green Management and Circular Economy, 4(1), 99–115.

Pindyck, R. S. (2013). Climate change policy: What do the models tell us? Journal of Economic Literature, 51(3), 860–872. https://doi.org/10.1257/jel.51.3.860

Rehman, N., Mahmood, A., Ibtasam, M., Murtaza, S. A., Iqbal, N., & Molnár, E. (2021). The psychology of resistance to change: The antidotal effect of organizational justice, support, and leader-member exchange. Frontiers in Psychology, 12, 678952. https://doi.org/10.3389/fpsyg.2021.678952

State Bank of Pakistan (SBP). (2017). Green Banking Guidelines (GBG). www.sbp.org.pk

Yameen, J., Kijkasiwat, P., Hussain, A., Farooq, M. A., & Ajmal, T. (2024). Green finance in the banking industry: A systematic literature review. SN Business & Economics, 4(8), 91. https://doi.org/10.1007/s43546-024-00683-w

Yuan, X. (2009). Green investment and financial risk: Evidence from sustainable projects. Journal of Banking & Finance, 33(4), 745-760.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77-101.

Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). Sage publications.

Saunders, M., Lewis, P., & Thornhill, A. (2019). Research methods for business students (8th ed.). Pearson Education.
State Bank of Pakistan (SBP). (2017). Green Banking Guidelines (GBG). www.sbp.org.pk
Falcone, P. M., & Sica, E. (2019). Assessing the opportunities and challenges of green finance in Italy: An analysis of the biomass production sector. Sustainability, 11(2), 517. https://doi.org/10.3390/su11020517
Hlobil, T., & Van Leuvensteijn, M. (2020). The impact of green finance on credit risk reduction in European banks. Journal of Sustainable Finance, 7(3), 112-128.
Irfan, D. M., & Ullah, R. (n.d.). The implications of green finance on credit risk in Pakistan's banking sector.
Khan, A., Laeeque, S. H., & Munir, M. (2024). Green banking in Pakistan: A qualitative study. Asian Bulletin of Green Management and Circular Economy, 4(1), 99–115.
Pindyck, R. S. (2013). Climate change policy: What do the models tell us? Journal of Economic Literature, 51(3), 860–872. https://doi.org/10.1257/jel.51.3.860
Rehman, N., Mahmood, A., Ibtasam, M., Murtaza, S. A., Iqbal, N., & Molnár, E. (2021). The psychology of resistance to change: The antidotal effect of organizational justice, support, and leader-member exchange. Frontiers in Psychology, 12, 678952. https://doi.org/10.3389/fpsyg.2021.678952
Yameen, J., Kijkasiwat, P., Hussain, A., Farooq, M. A., & Ajmal, T. (2024). Green finance in the banking industry: A systematic literature review. SN Business & Economics, 4(8), 91. https://doi.org/10.1007/s43546-024-00683-w
Field, A. (2018). Discovering statistics using IBM SPSS statistics (5th ed.). Sage publications.
Bryman, A., & Bell, E. (2015). Business research methods (4th ed.). Oxford University Press.
Pallant, J. (2020). SPSS survival manual: A step-by-step guide to data analysis using IBM SPSS. McGraw-Hill Education.
Patton, M. Q. (2015). Qualitative research & evaluation methods: Integrating theory and practice (4th ed.). Sage publications.
Strand, S. (2006). Book Reviews. British Journal of Educational Psychology, 76(2), 423–423. https://doi.org/10.1348/000709906X100611
Pallant, J. (2004). SPSS survival manual: A step-by-step guide to data analysis using SPSS for Windows (Versions 10 and 11); [applies to SPSS for windows up to version II] (Repr). Open Univ. Press.
Falcone, P. M., & Sica, E. (2019). Assessing the opportunities and challenges of green finance. Sustainability, 11(2), 517.
Hunt, A., Taylor, S., & Morgan, D. M. (2020). Modelling investment plans at asset portfolio level. IFAC-PapersOnLine, 53(3), 143–148.
Khan, A., Laeeque, S. H., & Munir, M. (2024). Green Banking in Pakistan: A Qualitative Study. The Asian Bulletin of Green Management and Circular Economy, 4(1), 99–115.
Mazzocchetti, A., Raberto, M., Teglio, A., & Cincotti, S. (2018). Securitization and business cycle: An agent-based perspective. Industrial and Corporate Change, 27(6), 1091–1121.
Pindyck, R. S. (2013). Climate change policy: What do the models tell us? Journal of Economic Literature, 51(3), 860–872.
Rehman, M., Shahzad, F., & Ali, A. (2021). Green finance and credit risk: An empirical investigation. International Journal of Financial Studies, 9(2), 45-61.