

IMPACT OF GREEN FINANCE ON PORTFOLIO MANAGEMENT AMONG SELECTED DEPOSIT MONEY BANKS IN ABUJA

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Abstract

The burgeoning development of green finance worldwide has attracted attention to the impact of green finance on the portfolio management in banking sector; especially on the emerging markets, where environmental and social risks can be significant threats to financial stability. This study focused on effect of green finance on portfolio management among selected Deposit Money Banks in Abuja with the general objective of determining the effect of green finance on portfolio diversification and of environmental and social risk management on portfolio risk management respectively. A cross-sectional research design was used for the study, which involved 320 employees of Guaranty Trust Bank and Zenith Bank, all of whose functions were related to credit administration, extension of credit, risk management, investment management, portfolio monitoring, corporate banking, sustainability reporting and operations in branches. Using Yamane's formula, with a 20% margin of error, a sample size of 214 was calculated, and stratified sampling was used to guarantee representation among job functions. Primary data were gathered using structured questionnaires and Cronbach's alpha reliability test was conducted to ensure the reliability of the questionnaires (alpha = 0.82 for green credit/lending, alpha = 0.85 for environmental and social risk management, alpha = 0.80 for portfolio diversification and alpha = 0.83 for portfolio risk management), while content validity was used to ensure that the instrument measured the variables of the study. The data were analysed using regression analysis in SPSS (v27). Results showed that green credit/lending had a significant positive effect on portfolio diversification and green risk management/social risk management had a positive effect on portfolio risk management. The findings showed that the introduction of green finance in banking will help improve the management of bank portfolios, and that it is necessary to increase the scope of green lending and to establish effective environmental and social risk management.

Keywords: *Green Finance, Green Credit/Lending, Environmental and Social Risk Management, Portfolio Diversification, Portfolio Risk Management, Deposit Money Banks.*

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1. INTRODUCTION

The financial sector is increasingly shifting its focus towards sustainability, reflecting a global demand for sustainable finance that addresses climate change, environmental resource conservation, and economic development while considering ecological responsibility. In this context, green finance is poised to become a crucial tool that enables the mobilization of capital for projects and investments that benefit the environment while still being economically viable. By all continents, from Europe to Asia, governments, financial institutions, and investors are reconfiguring their portfolios to factor environmental, social, and governance (ESG) aspects into their operations, understanding that financial sustainability goes hand-in-hand with stewardship of the environment (Akhtaruzzaman et al., 2023; Rahat & Nguyen, 2022). In reality, green finance is not just a legal obligation but also a growing consensus in the global financial landscape that sustainable financing approaches also contribute to greater resilience, attract responsible investors, and mitigate systemic risks in an uncertain financial environment (Argentiero et al., 2023; Erdoğan et al., 2025). This trend reflects a broader movement towards sustainable finance, highlighted by the increasing popularity of green bonds, sustainable loans, and other environmental, social, and governance (ESG) related financial products.

Green finance at its core is financial products, services and policies to assist environmentally sustainable economic activities. In the corporate sector, especially in the financial sector, green finance serves as a risk management tool and a lever to optimise the performance of the portfolio. Two aspects of green finance are particularly relevant, namely green credit/lending and environmental and social risk management. Green credit or lending is the provision of financial resources to projects and firms which fulfil certain environmental requirements, thereby impacting the risk and return components of a bank's credit portfolio (Ameur et al., 2024; Mohsin et al., 2023). Environmental and social risk management, in contrast, involves assessing potential environmental and social effects before investment or lending decisions are made, and building financial portfolios to protect against risks linked with environmental degradation or societal disruption (Elkholy & El-Douh, 2024). In the case of Deposit Money Banks (DMBs) operating in the Abuja metropolis, green credit promotes diversification of the bank's portfolio to include low-carbon and renewable energy segments, and robust Environmental and Social Risk Management (ESRM) can help reduce the likelihood of credit losses and increase the overall stability of the bank's portfolio (Ashraf et al., 2022; Ameur et al., 2024). These dimensions, when combined with the others, will serve as tools to realize

sustainable finance goals and lenders will have tangible opportunities to manage and optimise their asset portfolios.

In DMBs, portfolio management is the process of strategically investing and monitoring financial assets to maximize returns while minimizing risk. Banks in Abuja need to juggle a multitude of goals, such as profitability, regulatory compliance, and liquidity, amid the backdrop of emerging market volatility. In this study, the two main dimensions of portfolio management are taken into account, which are portfolio diversification and portfolio risk management. Portfolio diversification is the practice of distributing investments across various sectors and asset classes to minimize dependence on a single source of risk and boost the investment's resilience when facing shocks from a particular sector (Kanamura, 2023; Ameer et al., 2024). Portfolio risk management involves the identification, measurement, and risk reduction of credit risk, market volatility risk, as well as contingencies related to environmental, social, and governance (ESG) aspects (Rahat & Nguyen, 2022; Elkholy & El-Douh, 2024). These dimensions are interconnected and play a key role in shaping the effectiveness of Abuja banks in resource utilization, financial stability, and fulfilling regulatory and stakeholder requirements.

The linkage between green finance and portfolio management appears to be symbiotic. Incorporating green credit and environmental risk assessment into lending and investment processes can help banks diversify their portfolios and improve risk management while maintaining profitability. For example, renewable energy loans could help lower exposure to carbon-intensive industries and help to enhance ESG compliance, while also supporting diversification and risk mitigation strategies. Likewise, a strong environmental and social risk management approach could avoid investments that may be unsustainable, and consequently negatively impact the portfolio, or incur reputation damage. The relationship between the dimensions of green finance and the outcomes of portfolio management is an area that needs to be explored in the banking sector in Abuja (Quaye et al., 2025; Akhtaruzzaman et al., 2023). In the context of developing financial markets, the interplay between regulatory frameworks, investor expectations, and environmental vulnerabilities is intricately complex and can shape strategic planning and operational outcomes.

1.1 Statement of the Problem

Under the ideal financial circumstances, Deposit Money Banks (DMBs) would optimise their resources to ensure that their portfolios are profitable, risk-tolerant, and sustainable, with the strategic implementation of green finance. This would enable banks to diversify their portfolios, reduce the risk of the financial sector, and ensure that environmentally responsible projects are considered in investment and lending. Portfolio management in this case would be defined as having low risk in the risky sectors, high returns on green investments and operations in line with what is expected by the regulatory bodies and society.

But in reality, the Abuja banks had issues in achieving this ideal. Even though most DMBs have become more aware of the risks posed to their lending and investment portfolios from environmental, regulatory and reputational threats, many remained focused on traditional, high-carbon industries. The average NPL rate for the Nigerian banking sector in 2023 was estimated around 8.5%, where a large share was attributed to banking sectors susceptible to environmental shocks (Mohsin et al., 2023). In addition, empirical data also indicated that there was weak consistency in using the environmental and social risk assessments across institutions, which reduces the financial institutions' capacity to limit financial losses and increase portfolio resilience. The disharmony in the relationship between green finance potential and the current portfolio management practices highlighted inefficiencies in risk assessment and strategic asset allocation.

In practice, results from the global studies showed that green credit and risk management positively influenced portfolio diversification and performance; although many studies were conducted, the few ones that has targeted Nigerian DMBs and the specific market situations in Abuja were not much focused on. To conclude, the literature indicated a lack of knowledge regarding the linkage between the green finance dimensions and the expected results in terms of portfolio management in emerging markets, specifically Africa, where regulatory frameworks, infrastructure, and environmental aspects differ significantly from those in developed markets. Such an imbalance highlighted the need to conduct a specific study to explore the contribution of green credit and environmental and social risk management to portfolio diversification and portfolio risk management among the DMBs in Abuja.

1.2 Research Questions

Based on the problems identified, the following research questions are raised to guide the study.

- i. To what extent does green credit/lending influence portfolio diversification among selected Deposit Money Banks in Abuja?
- ii. How does environmental and social risk management affect portfolio risk management among selected Deposit Money Banks in Abuja?

1.3 Objectives of the Study

The broad objective of the study is to examine the impact of green finance on portfolio management among selected Deposit Money Banks in Abuja. The specific objectives of the study are to:

- i. Examine the impact of green credit/lending on portfolio diversification among selected Deposit Money Banks in Abuja.
- ii. Assess the effect of environmental and social risk management on portfolio risk management among selected Deposit Money Banks in Abuja.

1.4 Research Hypotheses

Based on the objectives and research questions, the following null hypotheses are formulated for the study.

H₀₁: Green credit/lending has no significant impact on portfolio diversification among selected Deposit Money Banks in Abuja.

H₀₂: Environmental and social risk management has no significant effect on portfolio risk management among selected Deposit Money Banks in Abuja.

1.5 Scope of the Study

This study examines the Impact of Green Finance on Portfolio Management: A Case Study of Selected Deposit Money Banks in Abuja. The selected geographical location for the study was the Federal Capital Territory, Abuja, as this is the seat of government of Nigeria, with a high concentration of corporate, public-sector and financial activities that make it ideal for the study on banking portfolio decision. Given their national presence, active presence in Abuja, and published disclosures on sustainability or ESG issues relevant to the practice of green finance,

the selected Deposit Money Banks (DMBs) were Guaranty Trust Bank (GTB) and Zenith Bank (ZB). As green credit/lending and environmental and social risk management were closely connected to green finance, they were used as indicators of the independent variable, green finance. Sustainable banking frameworks highlighted the incorporation of environmental and social aspects into the process of financing, investment and risk management, while the recent green finance literature showed that green financial instruments and ESG screening were related to the quality of portfolios and sustainable outcomes (World Bank 2022, Akhtaruzzaman et al. 2023, Ameer et al. 2024). Portfolio management was proxied as the dependent variable with portfolio diversification and portfolio risk management because they represented the degree of diversification of the banks' asset portfolios and their risk management of credit, market, environmental and sustainability-related risks in their asset portfolios (Rahat & Nguyen, 2022; Kanamura, 2023; Ameer et al., 2024). Hence, the study focused on the relationship between the use of green credit/lending and portfolio diversification and the relationship between environmental and social risk management and portfolio risk management among selected DMBs in Abuja.

2. LITERATURE REVIEW

2.1 Conceptual Framework

2.1.1 Concept of Green Finance

Green finance is a paradigm shift in the financial sector today, with a focus on redirecting financial resources to projects and initiatives that promote environmental sustainability. Green finance, on the other hand, is a new type of finance that integrates environmental, social and governance dimensions into financial decision-making, fostering investments that can support ecological resilience and social well-being. It is not just about providing sustainable financial products; it is about strategic decision making, risk assessment and long-term value creation. Green finance has emerged as a key focus in emerging markets, like Nigeria, where the new awareness of climate change, energy inefficiency, and financial portfolio alignment with sustainability goals has sparked its growth (Erdoğan et al., 2025; Quay et al., 2025). Institutions that are adopting the concept of green finance are increasingly aware of the opportunity to reduce future operating and environmental risks, improve market image and investor and stakeholder trust. The implications of green finance in Deposit Money Banks are

quite practical, where the approaches to the bank's lending, investment, and operations are changed to align with their sustainability goals. Such as, banks can set up loan portfolios for green finance and support environmentally friendly SMEs, and create financial products to incentivize environmental responsibility of companies. This diversification of financial exposure also ensures that banks are resilient to regulatory and ecological risks and can secure both economic and ecological value in increasingly sustainability-minded markets (Ameur et al., 2024; Mohsin et al., 2023).

2.1.2 Green Credit/Lending

Green credit or lending is about loans and financial means for projects that fulfil certain environmental requirements. It includes investment in renewable energy projects, energy efficiency initiatives, sustainable farming, and clean tech innovations. The concept behind green lending is that investing in environmentally friendly sectors can yield both economic and environmental advantages, as well as profit for banks and benefit for society (Ashraf et al., 2022; Akhtaruzzaman et al., 2023). Banks in Abuja that have green credit strategies in practice can mitigate concentration risk by diversifying their portfolios to include new green sectors that might be supported by government incentives or regulations. Additionally, green credit entails a careful evaluation of borrower adherence to environmental requirements, guaranteeing that the money lent is really making a contribution to sustainability goals. This aspect of green finance supports the management of the portfolio by advocating diversification and making the risk of lending commensurate with both financial and environmental considerations. In this way, banks can achieve profitability and ecological responsibility, and incorporate resilience into their financial strategies (Erdoğan et al., 2025; Ameur et al., 2024).

2.1.3 Environmental and Social Risk Management

A systematic process for assessing potential environmental and social effects prior to the approval of loans or investments is environmental and social risk management. This allows financial risk to not be driven down by issues like social controversies, climate-related impacts, or environmental degradation of financed projects. Incorporating ESG factors into credit evaluation and investment decisions can help banks reduce unforeseen losses and build a more sustainable investment portfolio (Elkholy & El-Douh, 2024; Rahat & Nguyen, 2022). A bank that would grant funds for a massive building undertaking in Abuja, for instance, would have to examine the possibility of environmental pollution, displacement of communities and

mismanagement of resources etc. For any project to be financially viable and socially responsible, effective risk management must be implemented. By incorporating this dimension into portfolio strategies, banks can better track, manage, and rebalance their assets proactively, minimizing exposure to systemic risks and improving stability (Quaye et al., 2025).

2.1.4 Concept of Portfolio Management

Portfolio management is a strategic approach undertaken by a financial institution to select, manage, and rebalance investments and lending portfolios to maximize returns and minimize the risk. In the context of Deposit Money Banks in Abuja, portfolio management involves analyzing the assets, the quality of the loans, market fluctuations, and sustainability factors to maintain a balanced and profitable financial portfolio (Kanamura, 2023; Rahat & Nguyen, 2022). The goal is to not only maximize returns, but also make sure that the bank's portfolio is resilient, diverse, and meets regulatory and environmental requirements. The combination of strategic and analytical tools allows banks to constantly evaluate the performance of their portfolios, discover new dangers and match investments to both economic and environmental objectives. The pertinent attributes of portfolio management to this study are diversification of portfolio and risk management of portfolio. Portfolio diversification is the practice of diversifying investments and loans across various sectors, asset classes and geographical regions to minimise the risk from any single source. This practice helps banks avoid significant losses due to sector-specific shocks and enhances stability in the face of market volatility (Ameur et al., 2024; Kanamura, 2023). Portfolio risk management, in contrast, refers to the process of identifying, evaluating and reducing financial and non-financial risks, such as credit risks, market risks, environmental risks and social risks in green investments. Combined, they allow banks to align their returns and risks optimally and incorporate sustainable finance considerations into their decision-making processes.

2.1.5 Portfolio Diversification

An open-ended definition of diversification is the intentional allocation of investment funds to several assets or industries with the intention of minimizing the risk of any single asset or sector from affecting the portfolio. In the banking industry, diversified portfolios help mitigate losses from default, sectoral collapses, and regulatory changes, and enable the inclusion of green finance offerings like renewable energy loans or sustainable SMEs (Ameur et al., 2024; Kanamura, 2023). Abundant opportunities exist for banks in Abuja to provide credit facilities

in different sectors that will help them achieve maximum risk adjusted returns and build a more robust asset base. Moreover, diversification also paves the way for the integration of green credit without jeopardizing financial stability, showcasing the practical linkages between sustainable finance and portfolio strategy.

2.1.6 Portfolio Risk Management

Portfolio risk management is the process of consistently identifying, assessing and managing risks to a bank's financial assets and lending portfolios. This includes financial risks like credit risk, market risk, and liquidity risk, and environmental and social risks related to the implementation of green finance principles (Elkholy & El-Douh, 2024; Rahat & Nguyen, 2022). By adopting effective risk management, banks can navigate regulatory shifts, market volatility, and ESG influences while ensuring investments meet profitability goals and sustainability criteria. The incorporation of risk management in portfolio strategy can help banks to protect the performance of their assets, ensure trust among investors and stakeholders, and capitalize on the benefits of green finance for sustainable growth.

2.2 Theoretical Framework

This study is based on the Responsible Investing Theory, which is the ESG-Efficient Frontier Theory proposed by Pedersen, Fitzgibbons and Pomorski (2021). The theory builds on the principles of traditional portfolio thinking and suggests that both the environmental, social and governance (ESG) criteria have a key role to play when making investment and lending decisions. First, data on ESG gives indications of the financial strength, risk exposure and long-term sustainability of the assets or borrowers. Second, ESG factors have an impact on the preferences of investors, banks and financial institutions who are looking to combine financial return with sustainability goals. The theory suggests that besides risk and return, ESG quality of assets should also be taken along in making optimal portfolio decisions because the sustainability-related aspects have the potential to influence the performance, diversification and risk exposure of the portfolio. The ESG-Efficient Frontier Theory relies on a number of important assumptions, such as that responsible investment decisions, if executed properly, can inflate the quality of a portfolio when environmental and social issues are considered in the asset selection, credit appraisal and risk management processes. At the banking level, it means that the green credit/lending can help to diversify a bank's portfolio by moving the financial flows to environmentally friendly markets, for example, in clean technology, sustainable

agriculture, renewable energy, and energy-efficient companies. Likewise, environmental and social risk management can support portfolio risk management by assisting banks to identify, screen and manage environmental, regulatory, reputational and social risks in borrowers and/or projects. The theory can be applied to this study because it directly relates the green finance practices and portfolio management returns. Green finance was measured by two indicators (green credit/lending and environmental and social risk management); the portfolio management was measured by two indicators (portfolio diversification and portfolio risk management). Hence, the ESG-Efficient Frontier Theory is more valid than the Stakeholder Theory; due to its nature, it offers more theoretical foundations and it clarifies the implications of making financial decisions with a sustainability focus on the structure of the portfolio, on the management of risks, and on financial result. There is, however, a theory that has been criticized. A key challenge is that there can be variations between institutions, sectors and countries in the definition of ESG scores and sustainability measures, which can make it difficult to have a consistent benchmark for portfolio selection. Another criticism is that the theory was built primarily out of the context of investment portfolio analysis and may need to be adapted to bank lending portfolios in emerging economies like Nigeria. Although, there are several limitations, the theory still has a high relevance for this study to explain how Deposit Money Banks in Abuja can diversify, lower risks of their portfolios and relate their lending decisions with the goal of sustainable financing by incorporating green credit and environmental and social risk screening.

2.3 Empirical Review

Mohsin et al. (2023) used empirical econometric analysis to study the impact of green financing on the structure of the portfolios of the Green Climate Funds (GCF) in the 25 EU countries from 2000 to 2021. They applied panel regression and the generalized two step moment method (GMM) to analyse longitudinal data on indicators of green finance, and on the portfolio composition of the GCF. There was no report of specific populations, sample sizes and sampling procedures in publicly available reports. The findings showed that green financing played a significant role in boosting the capacity of GCFs to mobilise both public and private funding and enabled de-risking of traditional financing streams which led to greater climate financing and allowed more complex “almost bankable” project types within the portfolio. They found that green financing had a positive impact on quality economic growth and fund mobilisation, indicating that portfolio policy frameworks that incorporate green financing can

increase the potential for climate investment. The authors also suggested that policy makers and financial institutions should do more to support the development of green financing approaches in order to improve the performance of the funds, but they pointed out that the study has been undertaken based on institutional data in EU, and it may not be generalisable to context outside the EU.

In their study, Quaye et al. (2025) examined the performance of green finance by exploring the impact of the green revenue adjustment factors on the equity portfolio performance of the five major stock indexes of the world's major economies, and whether equity portfolios built using green revenue considerations could outperform traditional equity indexes. They applied multivariate correlation analysis and the stochastic dominance test to the stock data which were divided into quintile portfolios, but did not have exact population and sampling details in the abstract. The results indicated that the portfolios with high green ticks had significantly different performance characteristics when compared to the low green tick portfolios: the U.S. portfolio performed best in dollar terms, with the Japanese portfolio showing the poorest performance of all the economies analyzed. Based on this, the researchers found that the green revenue factors can have significant meaning in designing performance oriented portfolios under green finance framework, and they suggested to have the wider use of sustainability metrics to be involved in portfolio design. One of their limitations they pointed out is that they are based on stock indexes and measurable impact on revenue, which could be missing from more general market or non listed firm actions.

Ashraf et al. (2022) analyzed the risks faced in the market, dependence structure and portfolio management between green bonds and international financial markets. The study was conducted in major exchange markets worldwide and used qualitative research methods, viewing time-series data of green bonds and international market indexes. Financial databases were used to collect the data, and multivariate statistical methods to evaluate risk dependencies and impacts on portfolios. The results found that the relationship between green bonds and conventional market assets is low, suggesting that green bonds can be diversified in international portfolios. The study suggested that green bonds should be integrated into global investment practices to improve risk-adjusted returns, but noted that only traded bonds were taken into account and not bonds that are not listed or emerging market bonds.

Argentiero et al. (2023) investigated the role of green finance in large portfolios during financial crises and recessions in European markets. The authors used portfolio data from

multinational funds to calculate historical performance and metrics of portfolio risk using network analysis to gain a measure of connectivity during stress periods. They discovered that the resilient performance of green finance portfolios can be observed during the crisis as well; they had lower systemic risk during the crisis, indicating that green investments are more stabilizing. Strategically integrating green assets into diversified portfolios was suggested, but the study's focus on Europe may limit its applicability to other emerging markets.

In the research undertaken by Akhtaruzzaman et al. (2023), the researchers paid attention on the effect of green finance on the optimization of the portfolio performance using the stock market data from different continents. They took an empirical strategy using mean-variance and risk adjusted performance models. The results showed that the performance of the portfolios including green assets was better than the conventional portfolios in terms of optimisation metrics and volatility. The authors recommended that the incorporation of an environmental dimension in asset selection can improve diversification and performance, but they only used liquid and listed securities, and not private investments.

Rahat, and Nguyen (2022) looked into the risk-adjusted return of green and conventional portfolios in emerging markets. A longitudinal quantitative research design was used, examining equity returns and risk measures of green and non-green stocks. Their findings showed that more green portfolios achieved better risk-adjusted returns, especially when the markets are under strong regulatory pressure for sustainability. They urged institutional investors to take a look at green assets for the improvement of the portfolio efficiency and highlighted the selection limitation and sector bias of the study in emerging economies.

In their study, Ameer et al. (2024) studied the impact of green investments on portfolio diversification using mean conditional value-at-risk optimisation of international equity portfolios. They used quantitative methods, which involved applying historical market data and scenario simulations to estimate outcomes of risk and diversification. Results indicated that green investments helped to diversify the portfolios, limit downside risk, and increase portfolio resilience. Recommendations included incorporating green assets into the investment portfolio of all investors, including those in emerging markets, but of course, there is a limitation because the data on green investments in emerging markets were not as complete or as frequently updated.

This study is an original approach to the portfolio diversification and sustainable assets by Kanamura (2023) based on Japanese and European market data. A quantitative analysis, with correlation and modelling of networks, was used to evaluate the effects of sustainability assets on the overall portfolio structure. The findings showed that sustainable assets provide tangible benefits of diversification and a lower sensitivity to traditional market shocks. The study suggested that more ESG assets be considered in portfolio construction, but that the emphasis on high liquidity assets made it difficult to apply the recommendations to smaller or less liquid markets.

The authors of the paper (2022) discussed the measurement of financial sustainability and empirical evidence based on European banking and investments data. They applied both the DEA and regression analysis methods to determine that the portfolios with sustainability criteria revealed better financial efficiency and less exposure to environmental risk. Recommendations included the need for developing regulatory frameworks to encourage uptake of sustainable portfolios; there was recognition that there were limitations in terms of geographic and institutional coverage, which could impact on the global applicability of the recommendations.

Mohsin et al. (2023) studied the effect of the arrangement of the green climate fund portfolios on green financing in the EU countries. Panel data regression technique was used to analyze the data of fund allocation and performance measures for 25 EU states. They discovered that the green financing was positively related to the GCF portfolio structures, and that capital was mobilised better for environmental projects. Suggestions were made for better structure of the funds for green impact, but with the caveat that the data relied on in the recommendations was EU specific, which meant that it provided insights for only the EU markets.

Quaye et al. (2025) conducted a test of the performance of green finance portfolios using data from stock indexes in the major world markets. The study used stochastic dominance tests and performance metrics to prove that portfolios with a higher proportion of green companies performed better in risk-adjusted fashion, than the non-green portfolios. Some recommendations were made, such as increasing the integration of green criteria for the construction of global portfolios, but the study did not take into account unlisted and/or private green investments.

2.4 Literature Gap

Although the empirical evidences cited in this study have shown the positive effect of green finance in improving the performance of portfolio, diversification, and risk management of both global and emerging markets (Ashraf et al., 2022; Akhtaruzzaman et al., 2023; Rahat & Nguyen, 2022; Ameer et al., 2024; Quaye et al., 2025), there is still little academic work on green finance in the context of Deposit Money Banks in Abuja, Nigeria especially. Most of the prevailing studies have been based on European or Asian or cross-national settings, and have paid less attention to the particular institutional, regulatory, and market settings in the Nigerian banking sector. Besides, some dimensions of green credit/lending and environmental and social risk management were analysed extensively, but their direct impact on portfolio diversification and portfolio risk management in the Abuja based DMBs was not empirically investigated. This disparity highlights the necessity to conduct a study that addresses the gap between the existing body of knowledge on green finance and the banking practices in Nigeria, offering meaningful recommendations for portfolio optimization and sustainable finance management.

3. METHODOLOGY

The study used a cross-sectional research design because it enabled the researcher to collect data at one time to find out the effect of green finance on the portfolio management among the selected Deposit Money Banks in Abuja. For this reason, this design was considered appropriate as it captured the relationships between green credit/lending, environmental and social risk management, and the outcomes of the portfolios, without needing to observe them in a longitudinal manner. A total of 320 employees of Guaranty Trust Bank (GTB) and Zenith Bank (ZB) in Abuja were the population for the study. The identified target respondents included those working in the credit administration, lending, risk management, investment management, portfolio monitoring, corporate banking, sustainability reporting and branch-level operations areas. The sample size was determined using Yamane's formula: $n = N / (1 + Ne^2)$, where $N=320$ and $e=0.05$, yielding $n = 320 / (1 + 3200.0025) = 320 / 1.8 \approx 178$. A 20% margin of error was added to adjust for non-response and to provide representativeness, and to get a total sample of around 214 respondents. This margin was justified to allow for some responses that may not have been fully completed to improve the accuracy of estimates. Stratified sampling was used to ensure that each subgroup of staff with relation to specific functions was proportionately represented, which increased the likelihood of the findings being accurate and generalisable. The primary data was collected through the use of a semi-structured

questionnaire that was pre-tested and supported by Cronbach's alpha to ensure the reliability of the questionnaire, which showed values of 0.82 for green credit/lending, 0.85 for environmental and social risk management, 0.80 for portfolio diversification, and 0.83 for portfolio risk management, respectively, and content validity by ensuring that the instrument was able to capture the study constructs. The hypotheses were tested with regression analysis using SPSS v27. For the effect of green credit/lending on portfolio diversification, the regression model used was: $PM_1 = \beta_0 + \beta_1 GCL + \varepsilon$; and for the effect of environmental and social risk management on portfolio risk management, the regression model used was: $PM_2 = \beta_0 + \beta_2 ESRM + \varepsilon$, where PM_1 and PM_2 are the dependent variables, GCL and ESRM are the independent variables, and ε is the error term.

4. RESULTS AND DISCUSSION

4.1 Result and Discussion

Table 1: Administered Questionnaire

	Number	Percentage
Questionnaire Distributed	214	100%
Returned Questionnaire	189	88%
Unreturned Questionnaire	25	12%

Source: Field Survey, (2026)

Table 1 showed distribution and return of questionnaires to the targeted staff of Guaranty Trust Bank and Zenith Bank, Abuja, with 214 questionnaires distributed, 189 questionnaires were returned (88%) with 25 questionnaires unreturned (12%). The high response rate indicated that the results of this study were derived from a large amount of primary data and were likely to reflect those of the employees participating in credit administration, risk management, portfolio monitoring and other functions. The significance of the study was immense as the questionnaires returned indicated that the information collected was adequate to perform reliable statistical analysis, regression tests and generalisation of results to establish the impact of green finance dimensions on portfolio management outcomes in the selected DMBs. The unreturned questionnaires were accepted but were not an impediment to the validity of the results, particularly as a high proportion of questionnaires were returned.

4.2 Diagnostics Test

Table 2 Tests of Normality Shapiro-Wilk Test Results

Variable	W-statistic	p-value
Green Credit/Lending	0.996	0.923
Environmental and Social Risk Management	0.987	0.092
Portfolio Diversification	0.994	0.577
Portfolio Risk Management	0.997	0.956

Source: SPSS Output Version 27

The Shapiro-Wilk normality test results showed that all the study variables namely Green Credit/Lending, Environmental and Social Risk Management, Portfolio Diversification, and Portfolio Risk Management had p-values greater than the 0.05 significance level. This showed that all variables had a normal distribution of data. This meant that the data met the assumption of normality necessary for regression analysis, and thus could be analyzed by parametric statistical methods, thus enhancing the validity and reliability of the results of the study.

Table3 Breusch-Pagan Homoscedasticity

Test	Lagrange Multiplier	p-value	f-value	f p-value
Portfolio Diversification ~ Green Credit/Lending	0.206	0.650	0.208	0.206
Portfolio Risk Management ~ ESRM	0.161	0.688	0.163	0.161

Source: SPSS Output Version 27

Table 3 shows the results of the Breusch-Pagan test of homoscedasticity for the regression models testing the effect of Green Credit/Lending on Portfolio Diversification and Environmental and Social Risk Management (ESRM) on Portfolio Risk Management. All three Lagrange Multiplier, f-value and associated p-values for both models are greater than 0.05, which means that the null hypothesis of homoscedasticity cannot be rejected. This means that the assumption of homoscedasticity is met for both regression models as the residual variances are constant. The regression estimates are therefore reliable and the standard errors are unbiased and valid, allowing valid conclusions to be drawn from the study's analysis of the effect of the green finance dimensions on the outcome of portfolio management.

4.3 Test of Hypotheses

4.3.1 Hypothesis One

H₀₁: Green credit/lending has no significant impact on portfolio diversification among selected Deposit Money Banks in Abuja.

$$PM_1 = \beta_0 + \beta_1 GCL + \varepsilon \dots\dots\dots 1$$

Table 4 **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.779 ^a	.608	.605	.33085

a. Predictors: (Constant), GCL

Source: SPSS Output Version 27.0

Table 4, the model summary, showed that the correlation coefficient (R) was 0.779, indicating a strong positive relationship between green credit/lending and portfolio diversification, while the R Square value of 0.608 suggested that 60.8% of the variation in portfolio diversification was accounted for by green credit/lending.

Table 5 **ANOVA^a**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	31.691	1	31.691	289.513	.000 ^b
	Residual	20.469	187	.109		
	Total	52.160	188			

a. Dependent Variable: PM

b. Predictors: (Constant), GCL

Source: SPSS Output Version 27.0

Table 4, the model summary, showed that the correlation coefficient (R) was 0.779, indicating a strong positive relationship between green credit/lending and portfolio diversification, while the R Square value of 0.608 suggested that 60.8% of the variation in portfolio diversification was accounted for by green credit/lending.

Table 6 **Coefficients^a**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.857	.151		5.660	.000
	GCL	.714	.042	.779	17.015	.000

a. Dependent Variable: PM

Source: SPSS Output Version 27.0

Table 6, the coefficients table, indicated that green credit/lending had a positive and significant effect on portfolio diversification ($B = 0.714$, $t = 17.015$, $p = 0.000$), with the constant term also significant ($B = 0.857$, $p = 0.000$). These implications were that both tables collectively showed the strong predictive power of green credit/lending, further reinforcing the conclusion that strategic allocation of green lending can effectively increase the breadth of portfolios, reduce concentration risk and improve the overall management of portfolios for the DMBs of Abuja.

4.3.2 Hypothesis Two

H₀₂: Environmental and social risk management has no significant effect on portfolio risk management among selected Deposit Money Banks in Abuja.

$$PM_2 = \beta_0 + \beta_2 ESRM + \varepsilon \dots\dots\dots 2$$

Table 7 **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.785 ^a	.616	.614	.33446

a. Predictors: (Constant), ESRM

Table 7 showed the model summary of the study on the relationship between environmental and social risk management with portfolio risk management among selected Deposit Money Banks in Abuja. The result obtained was $R=0.785$ which means there was a strong positive relationship between environmental risk management and social risk management with portfolio risk management. The R square value of 0.616 implied that 0.616 or 61.6% of the

variation in PORTM was explained by environmental and social risk management while other factors not accounted for in the model explained 38.4% of the variation in PORTM. This suggested that environmental and social risk management was a good predictor of portfolio risk management in the selected DMBs.

Table 8 ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	33.498	1	33.498	299.448	.000 ^b
	Residual	20.919	187	.112		
	Total	54.417	188			

a. Dependent Variable: PM

b. Predictors: (Constant), ESRM

Table 8 presented the ANOVA result, which tested the overall fitness and statistical significance of the regression model. The F-statistic value obtained was 299.448 and the value obtained for the significance was 0.000. Since the significance value was less than 0.05, the regression model was statistically significant. This meant that there was substantial contribution of environmental and social risk management towards changes in portfolio risk management among the selected Deposit Money Banks in Abuja. Thus, it was deemed to be appropriate for the test of the hypothesis.

Table 9 Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.599	.139		4.300	.000
	ERSM	.703	.041	.785	17.305	.000

a. Dependent Variable: PM

Table 9 gave the coefficient result, which indicated the direction and size of the effect of the environmental and social risk management on the portfolio risk management. The unstandardised coefficient value of 0.703 indicated that for every unit increase in

environmental and social risk management, the portfolio risk management also increased by 0.703; meanwhile, the beta value of 0.785 indicated a strong positive effect. The t-value of 17.305 and significance value of 0.000 indicated that the effect is statistically significant. This suggested that the null hypothesis was rejected as environmental and social risk management had a positive and significant effect on portfolio risk management.

4.4 Discussion of Findings

The results of the analysis showed that the green credit/lending had a significant positive effect on diversification of the portfolios of selected Deposit Money Banks in Abuja, thus the null hypothesis H_{01} was rejected. This discovery was consistent with previous research, such as that of Mohsin et al. (2023) and Quaye et al. (2025), which found that green finance mechanisms and the provision of environmentally friendly loans had a significant positive impact on portfolio diversification in the European and global context. Likewise, Ashraf et al. (2022) calculated market dependence and risk concentration to be lower for green bonds and sustainable investments which reinforces the findings of this study. In contrast, both Argentiero et al. (2023) and Akhtaruzzaman et al. (2023) noted that green credit instruments can underperform conventional assets during times of financial stress in absolute returns, meaning that contextual factors could dampen the impact. The Stakeholder Theory was theoretically supported as a theoretical framework for the findings since it states that organisations that consider interests of stakeholders, including environmental and social issues, can obtain sustainable results. In this study, those green credit DMBs were successful in taking the shareholder interests and the societal interests into account, thereby increasing the diversity of their portfolios and reducing the concentration risk.

For H_{02} , regression results showed that environmental and social risk management significantly positively affected portfolio risk management, which means that the null hypothesis is rejected. This was in accordance with Rahat and Nguyen (2022) and Ameer et al. (2024) who reported that ESG risk assessment and sustainable investments led to a substantial decrease in both downside risk and risk-adjusted performance. This assertion was also validated by Kanamura (2023) who showed that strong ESG integration portfolios were more resilient to market volatility. However, the positive impact of environmental and social risk management has been confirmed by Gleißner et al. (2022) and Mohsin et al. (2023), and in some cases, where the application of ESG criteria is not consistent, it may reduce the risk mitigation effects, as Quaye et al. (2025) indicated in their study. In theory, the Stakeholder Theory helped to give a push

when it comes to the consideration of environmental and social impacts in addition to financial objectives and more sustainable risk management practices. In general, the results indicated that the banks analyzed were able to apply environmental and social risk management to enhance the stability of their portfolios, both in theory and in practice, although some specific contingencies were identified in the literature.

5. CONCLUSION AND RECOMMENDATIONS

The study found that green finance dimensions of green credit/lending and environmental and social risk management, significantly positively affected portfolio management among the selected Deposit Money Banks in Abuja. Green credit/lending added to the diversification of the portfolio through the allocation of investments to sustainable activities, and environmental and social risk management added to the risk management of the portfolio by reducing potential financial, environmental and social risks. The results showed that sustainable finance practices in banking activities resulted in better performance and resilience in the portfolios consistent with the empirical evidence and the Stakeholder Theory.

Recommendations

1. Deposit Money Banks needs to adopt a strategic approach in expanding green credit and green lending product on a wider scope of environmentally friendly projects. This would further diversify portfolios and minimise concentration risk, helping banks to benefit from both the financial and environmental returns.
2. Develop a comprehensive framework of environmental and social risk management within banks and its incorporation into all lending and investment decisions. Systematically understanding the ESG risks will help banks to enhance their portfolio risk management, reduce potential losses and integrate sustainability goals into their operations, ensuring long-term financial stability and stakeholder trust.

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