



Green Bonds and Financial Performance of Commercial Banks in Kenya

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Abstract

The study investigated the relationship between green bonds and the financial performance of commercial banks in Kenya. A quantitative research design using panel data analysis was used. The study adopted a census approach where 14 commercial banks having complete data for the period 2020–2024 were used. Secondary data was gathered from audited annual reports, financial statements, sustainability reports and publications by Central Bank of Kenya, using a structured data extraction template. Descriptive statistics (mean, standard deviation, minimum, maximum, skewness, and kurtosis) and inferential statistics (Pearson's correlation analysis and fixed-effects panel regression analysis) were used to analyse the data. The results showed that green bonds positively and statistically significantly influenced financial performance ($\beta = 0.0905$, $p = 0.005$). The results support the theoretical propositions of Institutional Theory. The study adds to literature by offering empirical evidence on the green bonds and financial performance relationship in the Kenyan banking context. The results can be used to develop policies on green finance adoption and sustainable banking. The commercial banks are urged to boost the issuance of green bonds to boost their profitability and promote environmental sustainability.

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Introduction

Green bonds are one of the green finance instruments that have become very prominent as a source of capital for green projects like renewable energy, energy efficiency, and climate adaptation (Mutuku & Kaburu, 2024). Green bonds are bonds that are issued to finance projects that have environmental benefits and support sustainable development (Mwangi, 2022).

Commercial banks are key players in the green bond market, as issuers, underwriters and investors in green bond portfolios. Cumulative issuance of green bonds has grown exponentially globally to more than \$2.5 trillion by 2023 (Climate Bonds Initiative, 2023). The link between green bond issuance and financial outcomes is not yet clear, however, especially in developing countries like Kenya. Positive impacts have been reported (Flammer, 2021; Tang & Zhang, 2020), and insignificant or short-term negative outcomes have been reported (Sino, Baraza, & Monari, 2025; Mutuku & Kaburu, 2024).



The green bond market in Kenya is still in its infancy. In 2019, the first green bond valued at approximately KES 4.3 billion was issued by Acorn Holdings Limited, which was lead arranged by Stanbic Bank Kenya (Stanbic Holdings Plc, 2023; Acorn Holdings, 2019). This gave the bank a stronger foothold in green finance, but these efforts were costly, both in the initial compliance with green bond frameworks and in the continuous reporting on environmental performance (Acorn Holdings, 2019). As a result, green bond financing may not be profitable in the short-term, even if it is beneficial in the long-term. In 2019, KCB Group further intensified its initiatives in promoting green projects by implementing tools like green credit, investing in renewable energy businesses and exploring green bonds. These include investments in renewable energy, sustainable agriculture and other climate-related projects that require substantial initial investment and have a longer payback period. As a result, the bank's profit after tax declined from KES 25.2 billion in 2019 to KES 19.6 billion in 2020 (KCB Group, 2020). This implies that the short-term impact of green bond financing may be on profitability because of delayed returns.

Globally, the green bond market has experienced exponential growth, surpassing USD 2.5 trillion by 2023 (Climate Bonds Initiative, 2023). However, the translation of this growth into improved financial performance for issuing banks remains unclear, with mixed evidence from developed and developing economies (Flammer, 2021; Tang & Zhang, 2020; Sino, Baraza, & Monari, 2025). In Africa, the green bond market is still nascent, with South Africa, Nigeria, and Kenya leading in issuance (Tolliver, Keeley, & Managi, 2020). Regionally, East African banks have begun incorporating green bonds into their financing portfolios, yet the financial outcomes of these initiatives are not well understood (Mutuku & Kaburu, 2024). In Kenya, despite increased green financing activities, commercial banks have experienced stagnation and declining profitability, with the average return on equity (ROE) declining by 2.3% in 2023 (CBK, 2024). This raises concerns about whether increased green finance activities are effectively translating into improved financial performance among commercial banks in Kenya.

There have been conflicting findings in previous studies conducted in Kenya. Sino, Baraza and Monari (2025) investigated the relationship between green financing and the financial performance of the commercial banks listed on the Nairobi Securities Exchange (NSE) and concluded that there was a positive relationship, but it was not statistically significant. Mwangi (2023) on the other hand, examined the impact of green financing practices on financial performance of Kenyan banks and found a positive relationship. The mixed results suggest that the connection between green bonds and financial performance in Kenya is still unclear.

Research Hypothesis

H₀₁: Green bonds do not have a significant effect on the financial performance of commercial banks in Kenya.

Theoretical Review

Institutional Theory

Institutional Theory posits that organisations adopt certain practices not only for efficiency but also to gain legitimacy within their institutional environment (Meyer & Rowan, 1977). DiMaggio and Powell (1983) identified three mechanisms through which institutional isomorphism occurs: coercive isomorphism, which results from formal and informal pressures exerted by organisations upon which the firm depends (e.g., regulatory requirements from the Central Bank of Kenya); normative isomorphism, which stems from professionalisation and shared norms among industry players (e.g., industry best practices in sustainable finance); and mimetic isomorphism, which arises when



organisations imitate the successful practices of peers in response to uncertainty (e.g., banks copying green bond strategies of leading institutions).

In the context of this study, the Central Bank of Kenya's (CBK) guidance on climate-related risk management (CBK, 2023) and sustainable finance principles exert coercive pressure on banks to adopt green finance practices. Industry expectations and professional standards create normative pressure, while the observed success of early green bond issuers such as Acorn Holdings and Stanbic Bank Kenya creates mimetic pressure for other banks to follow suit. Campiglio (2016) demonstrated that UK financial institutions were more willing to make investments related to climate change because of regulatory changes. Likewise, Anyango (2022) reported that the primary reason for the adoption of sustainable finance practices by the banks in Ghana was the regulatory guidelines and industry expectations. In Institutional Theory, the issuance of green bonds is a way for banks to obtain legitimacy and retain stakeholder trust. Institutional pressures lead to adoption even if the short-term financial gains are small (Sino, Baraza, & Monari, 2025). Meeting regulatory expectations and industry standards helps to avoid reputational risk and regulatory penalties (Meyer & Rowan, 1977).

Conceptual Review

Green bonds have been defined differently by various scholars and practitioners. Mutuku & Kaburu (2024) defined green bonds as fixed-income securities used to raise funds specifically for environmentally-friendly projects such as renewable energy and climate adaptation. Similarly, Mwangi (2022) defined green bonds as financial instruments whose proceeds are strictly allocated to projects that generate environmental benefits and promote sustainable development. In Kenya, green bonds are also described as bonds whose funds are earmarked exclusively for projects with positive environmental outcomes, such as pollution control and conservation.

Green bonds are important in the Kenyan context for several reasons. First, they support environmental sustainability by financing projects that address climate change and resource conservation (Mutiso, 2019). Second, they provide an alternative source of capital for development projects, especially where traditional financing is limited (Magale, 2021). Third, green bonds promote the transition to a low-carbon economy in Kenya by directing funds toward climate-resilient investments. Fourth, they enhance transparency and accountability in the use of funds since issuers are required to report on environmental impact and use of proceeds. Finally, green bonds attract both local and international investors, thereby deepening Kenya's capital markets and supporting economic growth (Sabare, 2022).

These studies show that green bonds are commonly measured by the value of green bonds issued or by the ratio of green bonds to total bonds and financial performance is primarily measured by Return on Assets (ROA) and firm value indicators. In this study, Green bonds will be measured as the proportion of green bonds issued relative to total bonds issued by the bank.

Financial Performance

Financial performance in this study is measured using Return on Assets (ROA), which is calculated as net income divided by total assets. ROA is a widely used indicator of bank profitability and efficiency in utilising assets to generate earnings (Flammer, 2021; Tang & Zhang, 2020). It reflects how effectively a bank's management uses its assets to generate profits. In the context of green bonds, ROA captures the extent to which green bond issuance contributes to overall bank profitability.

Conceptual framework

The Figure 1 conceptualised the relationship between green bonds, the independent variable and financial performance the dependent variable.



Figure 1: Conceptual framework

Empirical Review

In the United States, Flammer (2021) studied the relationship between corporate green bond issuance and firm financial performance. The total value of green bond issuances by firms was used to measure green bonds. The financial performance measures were Return on Assets (ROA), Tobin's Q, and stock returns. The study used panel regression analysis based on secondary data. The results indicated that the issuance of green bonds had a positive impact on the long-term value of the firm and investor confidence. The study concluded that green bonds enhance financial performance over time.

Tang and Zhang (2020) investigated the effect of green bond issuance on company performance in China. Green bonds were calculated as the amount of green bonds issued as a percentage of all bonds issued. The financial performance was assessed using ROA and operating profit margins. The study used difference-in-differences regression analysis with panel data. The results indicated that the financial performance of the companies that issued green bonds improved and the cost of capital decreased.

Tolliver, Keeley and Managi (2020) explored the development of the green bond market and the performance of the financial sector in South Africa. Data on institutional and national green bond issuance was used to measure green bonds. Financial performance was assessed based on financial sector growth indicators and rates of investment expansion. The results indicated that financial sector growth is positively related to green bond development.

Nnamdi and Okafor (2021) studied the relationship between green bond financing and profitability of banks in Nigeria. The value of green bond-funded projects as a proportion of financing activities was used as a measure for green bonds. ROA was used to measure financial performance. The study employed regression analysis on the annual financial reports. The results indicated a slight positive correlation between green bond financing and profitability.

Sino, Baraza and Monari (2025) investigated the association between green financing and financial performance of commercial banks listed on Nairobi Securities Exchange. Green bonds were assessed based on the participation of banks in green bond financing and investments in environmentally-friendly projects. ROA and ROE were used to measure financial performance. The study used panel regression analysis based on secondary data. The results indicated that there was a positive relationship between green financing and financial performance, although it was not statistically significant. The study found that green bond financing has not yet provided substantial financial returns because it is still in its early stages and has not yet been implemented.

Mutuku and Kaburu (2024) analysed the relationship between green bonds and bank performance in East Africa, with a focus on Kenya. The value of green bond-related financing activities of banks was used to measure green bonds. Profitability ratios like ROA were used to measure financial performance. The study used a regression analysis on panel data, and concluded that green bonds could have long-term positive effects but short-term negative effects on financial markets because of compliance and monitoring costs.



Methodology

The study adopted a quantitative research design using panel data analysis. The target population comprised all commercial banks in Kenya. A census approach was employed, and 14 commercial banks with complete data for the period 2020–2024 were included in the study. Secondary data were gathered from audited annual reports, financial statements, sustainability reports, and publications by the Central Bank of Kenya (CBK), using a structured data extraction template. Data analysis was conducted using STATA 15.0.

Panel Data Structure

The study used a panel dataset comprising 14 commercial banks observed over 5 years (2020–2024), yielding a total of 70 observations (14 banks × 5 years = 70 observations). Table 1 below presents the panel data structure, indicating the entity identifier (Bank ID), time identifier (Year), and the variables measured (Green Bonds Ratio and ROA) for each bank at each specific time period.

Table 1: Panel Data Structure

Entity (Bank ID)	Identifier	Time (Year)	Identifier	Green Bonds Issued/Total Bonds Issued (GB)	Return on Assets (ROA)
Bank 1		2020		GB _{1/2020}	ROA _{1/2020}
Bank 1		2021		GB _{1/2021}	ROA _{1/2021}
Bank 1		2022		GB _{1/2022}	ROA _{1/2022}
Bank 1		2023		GB _{1/2023}	ROA _{1/2023}
Bank 1		2024		GB _{1/2024}	ROA _{1/2024}
Bank 2		2020		GB _{2/2020}	ROA _{2/2020}
...		...		...	...
Bank 14		2024		GB _{14/2024}	ROA _{14/2024}

Source: Author (2026)

Data Analysis

Descriptive statistics, including mean, minimum, maximum, standard deviation, coefficient of variation, skewness, and kurtosis, were computed to summarise the central tendency and dispersion of the variables. Inferential statistics included the Jarque-Bera (JB) test for normality, Variance Inflation Factor (VIF) for multicollinearity, Pearson's Product-Moment Correlation Analysis to establish the nature and strength of relationships, and fixed-effects panel regression analysis to test the hypothesis. The fixed-effects model was chosen based on the Hausman test results, which indicated that the fixed-effects estimator was appropriate for the data.

Results

Descriptive Statistics

Descriptive statistics were computed to summarise the characteristics of the data used in the study. The statistics provided information on the central tendency and dispersion of the variables under



investigation. Specifically, the study calculated the mean, minimum, maximum, standard deviation, coefficient of variation, skewness, and kurtosis for all variables between 2020 and 2024. The variables included financial performance measured by Return on Assets (ROA) and Green bonds (GB). The results are presented in Table 2 below.

Table 2: Descriptive Statistics for Green Bonds and Financial Performance

Variable	N	Mean	Min	Max	Std. Dev	Skewness	Kurtosis
ROA (%)	70	2.516	-2.20	7.23	1.765	-0.132	2.960
Green Bond	70	0.0170	0.000	0.1785	0.0395	3.365	13.158

Source: Research Data (2026)

The results indicate that the average financial performance of the sampled firms, measured by ROA, was 2.516%, with values ranging from -2.20% to 7.23%. The standard deviation of 1.765 suggests moderate variability in financial performance among the firms during the study period.

For green bonds (GB), the mean ratio was 0.0170, implying that on average green bonds constituted approximately 1.7% of total bonds. The variable exhibited substantial variability as indicated by a standard deviation of 0.0395. The high positive skewness of 3.365 and kurtosis of 13.158 indicate a highly right-skewed distribution with extreme values, suggesting that only a few firms issued significant amounts of green bonds while many reported very low or zero values.

Inferential statistics

Normality Test

Normality was tested using skewness, Kurtosis and Jarque-Bera. Skewness values smaller than 2 and kurtosis value smaller than 6 should be considered normal (Tabor, 2011).

Table 3: Normality Test

Variable	JB	p-value	Kurtosis	Skewness
GB	5.132	0.0768	2.169914	0.517
ROA	0.2078	0.9013	2.960096	0.132

Source: Research Data (2026)

The results show that kurtosis values for all variables fall well below the threshold of 6, indicating acceptable distributional properties. This implies failure to reject the null hypothesis of normality, confirming that the data for all variables are approximately normally distributed. Consequently, the dataset satisfies the normality assumption required for regression analysis.

Multicollinearity test

Variance Inflation Factors (VIFs) and their reciprocals (tolerances) were computed for green bonds to assess multicollinearity. According to standard guidelines, VIFs should not exceed a value of 10. In this case, the VIFs were below 2, indicating that the independent variable did not violate the multicollinearity assumption.



Table 4: Multicollinearity test

Variable	VIF	1/VIF (Tolerance)
GB	1.18	0.849803
Mean VIF	1.18	

Source: Research Data (2026)

Simple Regression Analysis

Table 5: Model Summary for Green Bonds and Financial Performance

Model	Number of Observations	Number of Groups	Within R-squared	Between R-squared	Overall R-squared	F-statistic	Prob > F	Root MSE
1	70	14	0.1512	0.6342	0.2749	8.55	0.0053	0.2443

Predictor: LNGB (Green Bonds)

Dependent variable: LNROA (Financial Performance)

Model: Fixed-effects regression

Source: Field Data (2025)

The model summary indicates that Green Bonds explain 15.12% of the within-bank variation in financial performance. The fixed-effects model is statistically significant, $F(1,55) = 8.55$, $p = 0.0053$, indicating that Green Bonds significantly predict financial performance. The within R-squared of 0.1512 means that approximately 15.12% of the variation in LNROA within banks is explained by LNGB.

Table 6: Regression Coefficients

Variable	Coefficient (B)	Std. Error	t	P> t	95% Confidence Interval
Green Bonds (LNGB)	0.0905	0.0309	2.92	0.005	0.0283 – 0.1527
Constant	1.9683	0.1139	17.28	0.000	1.7393 – 2.1972

Dependent variable: LNROA (Financial Performance)

Model: Fixed-effects regression

Source: Field Data (2025)

The regression equation will be; $LNROA = 1.9683 + 0.0905LNGB$

The coefficient for Green Bonds is positive and statistically significant ($B = 0.0905$, $t = 2.92$, $p = 0.005$). This indicates that an increase in Green Bonds is associated with an increase in financial performance. Specifically, a one-unit increase in LNGB is associated with a 0.0905-unit increase in LNROA, holding the bank-specific fixed-effects constant.

Correlation Analysis

The study conducted Pearson's Product-Moment Correlation Analysis to establish the nature and strength of the relationship between the dependent variable, financial performance, and the independent variable, green bonds. The analysis was also used to assess multicollinearity among the predictor variables. The correlation coefficients range from -1 to +1, where values close to +1 indicate a strong positive relationship, values close to -1 indicate a strong negative relationship, and values close to zero indicate a weak or no linear relationship. The results are presented in Table 7 below



Table 7: Pearson Correlation Analysis

Variable	LNROA	LNGB
ROA	1	
GB	0.3334 (0.0157)	1

Source: Research Data (2026)

Table 7 shows that green bonds (GB) had a positive and statistically significant relationship with financial performance (ROA) ($r = 0.3334$, $p = 0.0157$). This implies that an increase in the ratio of green bonds to total bonds is associated with an improvement in firms' financial performance.

Regression Analysis

Regression analysis was used to test the hypotheses concerning the connection of independent variables with dependent variables. The main aim of regression analysis is to show how and to what extent each variable separately affects the dependent variables. Regression analysis is used to estimate the weight of the effects of the independent variables on the dependent variable.

Table 8: Fixed-Effects Regression Results for Green Bonds and Financial Performance

Variable	Coefficient (β)	Std. Error	t-value	p-value
Green Bonds GB)	0.0905	0.0309	2.92	0.005
Constant	1.9683	0.1139	17.28	0.000
Model statistics				
Statistic	Value			
Number of observations	70			
Number of banks	14			
Within R ²	0.1512			
Between R ²	0.6342			
Overall R ²	0.2749			
F-statistic	8.55			
Prob > F	0.0053			

Discussion of Findings

The results show that green bonds have a positive and significant effect on the financial performance of commercial banks in Kenya. This result is in line with Flammer (2021), who identified that the issuance of green bonds increased firm value and profitability in the United States. Likewise, Tang and Zhang (2020) found that the financial performance of green bond issuers in China was better, and their capital costs were lower. The findings also align with Mutuku and Kaburu (2024) who suggested that green bonds can be beneficial in the long run despite the initial costs of implementation.

There are several reasons why green bonds and financial performance are positively related. First, green bonds can help banks attract a larger share of environmentally conscious investors, which helps



diversify their investor base and potentially lower the cost of capital (Tang & Zhang, 2020). Second, the issuance of green bonds improves the institutional image and demonstrates a commitment to sustainability, which may lead to attracting customers, investors, and partners (Flammer, 2021). Third, green bond financing can facilitate investment in renewable energy and sustainable projects that can provide long-term returns and mitigate environmental risks (Tolliver, Keeley, & Managi, 2020).

The results, however, are in opposition to that of Sino, Baraza and Monari (2025) which found that there was a positive but statistically insignificant relationship between green financing and financial performance among listed banks in Kenya. This difference could be explained by the fact that more recent data (2020-2024) were included, a longer study period was used, and a larger sample of commercial banks was used in the current study. The results are also inconsistent with Nnamdi and Okafor (2021) who reported a low correlation in Nigeria, which may be attributed to the differences in market maturity and regulatory policies.

The results are consistent with Institutional Theory, which states that banks use green bonds as a way to become legitimate and respond to regulatory and industry pressures (Meyer & Rowan, 1977; DiMaggio & Powell, 1983).

Conclusion

The study findings show that green bonds positively and significantly influence the financial performance of commercial banks in Kenya. The results highlight that the use and issuance of green bonds positively affect profitability, as they make access to sustainable finance easier, attract investors with environmental preferences, and boost the institutional reputation. Hence, green bonds are one of the important green finance tools which can help to enhance financial performance of commercial banks.

The study revealed that the green bonds positively and significantly affect the financial performance of commercial banks in Kenya. Based on the study, the following recommendations are made: Commercial banks should promote the issuance and uptake of green bonds as a sustainable financing tool. Bank management should create new green bond products and expand their involvement in sustainable capital markets to gain the attention of investors with environmental concerns and increase profitability.

Policymakers and regulators, such as the Central Bank of Kenya (CBK) and the National Treasury, should create policy environments that promote green bond financing in the banking sector. This might involve tax measures, less capital needed to invest in green, and transparency in bond issuance and reporting. Furthermore, Bank management should incorporate green bond strategies into their long-term financing plans to take advantage of new opportunities that arise from sustainable development. Greater resource commitment to green bonds can help diversify funding sources, boost investment returns and enhance financial performance.

Regulators should set out more transparent guidelines and reporting requirements for green bonds to encourage transparency, accountability and consistency throughout the banking industry. These policies will help to ensure the stability of the financial sector while also helping to achieve Kenya's environmental sustainability and climate change targets.

In this study, the concept of green bonds was chosen as a part of green finance. Future research can be extended to include other aspects of green finance, such as green credit, Environmental, Social, and Governance (ESG) investments, green insurance, and carbon assets, for a more comprehensive evaluation.



The study was restricted to the commercial banks in Kenya. The analysis can be expanded to other financial institutions like microfinance banks, deposit-taking SACCOs, insurance companies, and investment companies in future research.

Moderating variables like firm size, corporate governance, and regulatory environment could be explored further in their impact on the relationship between green bonds and financial performance.

The findings from this study could be used as a basis for future research to examine if the relationship between green bonds and financial performance differs depending on the economy and regulation in different countries.

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