Green Finance and Environmental Performance: An empirical Evidence from Nigerian Banks

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Abstract

Environmental and social problems such as ecosystem degradation, the effects of climate changeare negatively impacting economies around the world.This study, therefore, investigates the mediating role of green monetary policy on the relationship between green finance and environmental performance with specific reference to Nigerian banks. A purposive sample technique was adopted to select 150 senior managers of the selected banks in Southwest, Nigeria. The data collection instrument for the study was structured questionnaire designed for the study and the simple percentage was employed to describe the demographic characteristics of the respondents, while the Structural Equation Modelling was used to test the hypotheses. The results reveal that green lending, green investment, and green bonds have a positive association with environmental performance, but are insignificant. Evidence Further reveals that green training and green technology have a significant influence on environmental performance.It was also revealed that green monetary policy does not mediate between green lending, green investment, green bonds, green training, green technology, and environmental performance. Therefore, Nigerian banks should start pursuing a green qualitative mitigation program that will stimulate green investment by developing and applying methods to identify and measure climate-related risks for the sector.

Keywords: Green finance, Green investment, Green training, Environmental Performance

Introduction

Environmental and social problems such as ecosystem degradation, the effects of climate change, drought and desertification, water pollution and shortages are negatively impacting economies around the world. This scenario forced people across the country to speak out about pollution and ecosystem damage. As a result, over 190 countries met in Paris with agreement to commit to limiting global warming to well below $2.^0$C., but the policy action failed (Masson-Delmotte,2018). In 2020, the United Nations Environment Program (UNEP) has received active attention from the banking sector to financially support climate change initiatives. As a result of NNEP's advocacy efforts, both developed and developing countries have embraced green finance(Oyedele, Olowookere, Gbadebo & Sajuyigbe, 2022). According to Ajibareand Oguntuase (2019), the Bank of England is pursuing a green qualitative mitigation program to stimulate green investment by developing and applying methods to identify and measure climate-related risks for financial institutions. The Central Bank of Lebanon supports green loans by reducing commercial bank reserve requirements by 100-150% of the loan amount if the bank's customers can provide the bank with a certificate from the Lebanon Energy Conservation Center (LCEC) that confirm the potential energy savings of the loaned project. In Bangladesh, banks need to set a green credit ratio for loans. It also subsidized the liquidity of banks that finance green activities. In China, central banks have adopted a green lending policy, where banking institutions focus on green lending and actively adjust their credit structure, effectively avoiding environmental and social risks and the real economy. Adopted by all relevant authorities to encourage promotion. Transformation of economic growth mode and adjustment of economic structure. In Japan, the central bank provides special subsidized liquidity to banks that lend to green activities(Ajibare &Oguntuase, 2019).

The Nigerian government is striving to tackle environmental problems, climate change, and the achievement of United Nations Sustainable Development Goals (SDGs) by 2030, through green finance, to sustain the green economy. To support this assertion, Shaumya, and Arulrajah(2017) argue that financial institutions need to play a vital role in the transition toward a sustainable economy, and thus necessitate policymakers across the globe to develop green monetary policies in order to achieve environmental sustainability to combat climate change based on the Paris agreement. In the same vein, Ngwenya, and Simatele,(2020) admonish that the green monetary policy measures rely heavily on taxonomies that define green activities and

environmental risks. That is, by making sufficient funds available for green projects to meet national pollution abatement targets and reducing the cost of green project investments through interest rate waiver, and tax exemption for green bonds.

A lot of research on green finance has been carried out in developed and emerging economies. Still, none has examined the mediating role of green monetary policy on the relationship between green finance and environmental performance. Thus, this study intends to bridge the existing gap in the literature by investigating the mediating role of green monetary policy on the relationship between green finance and environmental performance among selected Nigerian banks.

Theoretical Framework

This study is based on stakeholder theory developed by Freeman (1984) with the aim of connecting external stakeholders to corporate social responsibility functions. This theory creates value for all stakeholders by allowing financial institutions to fund green private investments and support green monetary policies and projects that contribute to environmental sustainability. (Oyedele et al., 2022). Studies prior to argue that the theory emphasizes that for maximum social welfare, financial institutions need to increase private investment through green finance and reduce environmentally harmful investment (Zhang et al., 2022; Zheng et al., 2021; Ngwenya and Simatele, 2020; Rehman et al., 2021).

A Bowie (2017) study confirms that sustainability of management's behavioral environment and ethical, moral and social obligations to stakeholders are strategies for achieving shareholder corporate orientation. Liu et al. , (2020) also confirm that financial institutions' support for green private investment is a prerequisite for environmental sustainability and social acceptance. Therefore, this theory argues that financial institutions must play an important role in the transition to environmental sustainability by 2030 in order for society to combat climate change syndrome (Khairunnessa., 2021). In line with the same policy, Kala, and Vidyakala(2020) demonstrate that financial institutions should play an ever-increasing role by integrating sustainability into their financial analytics and investment portfolios. It shows that it should play an important role. Similarly, Schoenmaker (2021) also admonishes that financial institutions should avoid polluting investments from a risk perspective, and invest in sustainable investments that will create long-term value for the wider community.

Conceptual Framework

Green finance has become a topic of the 21st century among scholars around the world. The construct is new in financial management and there is no consensus among scholars about the definition of green finance. Green finance is defined from various perspectives. According to Oyedele et al. (2022), green finance is described as the allocation of resources to green investment and green technology to support environmental sustainability and green citizens. Shafique, and Majeed(2020) see green finance as a source of funding to support private investment that contributes to achieving environmental sustainability. Xi, Wang, and Yang(2021) describe green finance as a mobilization of funds to support the transition to a more sustainable economy. Atef, (2017) defines sustainable finance as finance that takes into account environmental, social and governance (ESG) factors.

In addition, some studies have measured green finance using various parameters. For example, Oyedele et al (2022) measure green finance as green loans, investment, technology, and green training. A study by Dziwokand-Jäger (2021) measures green finance related to green lending, investment, fixed income, policy and refinancing transactions. In the same view, Shaumya and Arulrajah (2017) conceptualize green finance through green lending, green operations, green policy and green investment. Another study conducted by Kala and Vidyakala (2020) in India conceptualized green finance as green training and green projects. Akomea-Frimpongetal. (2021) As part of the major green finance products offered by banks, we conceptualized green finance as green securities, green investment, climate finance, carbon finance, green insurance, green credit and green infrastructure bonds.

Therefore, this current study defines green finance as sustainable finance related to the green investment portfolio that supports the transition to sustainable development. It is also designed by Green Lending, Green Investment, Green Bond, Green Technology and Green Training.

Conceptual Framework

Independent variables **Mediator** **Dependent Variable**

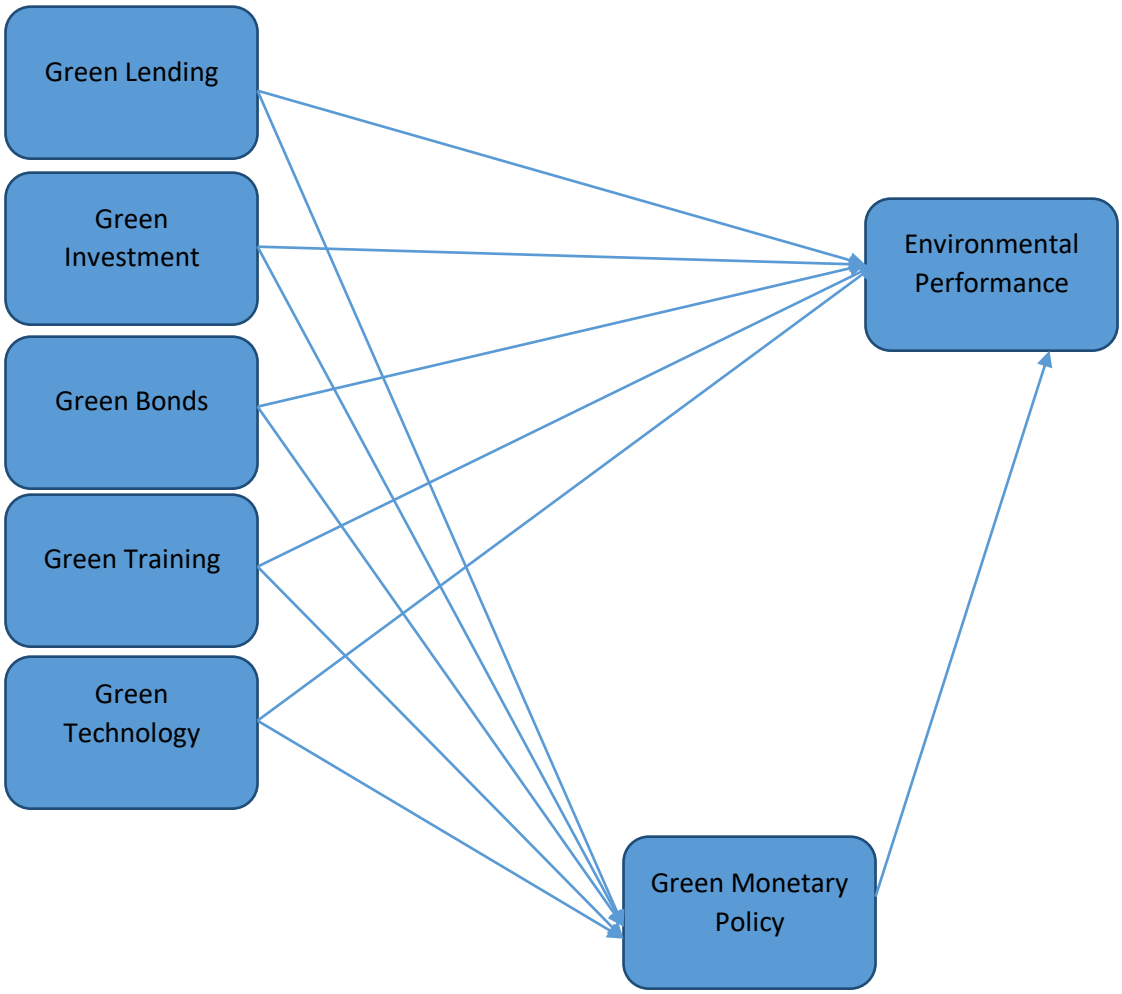

Figure 1: Conceptual Model

Empirical Review

Previous studies have associated green finance parameters with environmental performance in various sectors. For example, Oyedele et al. , (2022) conducted a survey on the impact of green finance and environmental performance on selected banks in Nigeria. The study found that green finance aspects such as green loans, green technology, green training and green

investment have a significant impact on environmental performance independently. Another study done by Zhang et al. (2022) Results conducted at banks in Bangladesh show that sustainable financial parameters (green lending, green investment, green bonds, green technology, and greentraining) have a significant impact on environmental performance. According to a study conducted by Dziwokand Jäger (2021), there is a linear relationship between green financial products (green loans, investments, bonds, policies, refinancing operations) and environmental sustainability. In the same view, Shaumya and Arulrajah (2017) confirm the parameters of green finance suh as green lending, green operations, green policies and green investments have important implications for environmental sustainability. Another study conducted by Kala and Vidyakala (2020) in India reveals aspects of green finance. The green training and green projects are linearly linked to environmental performance. Similarly, the study conducted by Risal and Joshi (2018) is consistent with previous studies that green financial products (green training, green policy, green projects) are important predictors of environmental performance. Akomea-Frimpongetal. (2021) confirms that green finance as green securities, green investment, climate finance, carbon finance, green insurance, green credit and green infrastructure bonds are part of the bank's leading green finance products. Thus, the following research hypotheses are formulated as follows (see Figure 1)

H_1: There is a significant association between green lending and environmental performance

H_2: There is a significant association between green investment and environmental performance.

H_3: There is a significant association between green bonds and environmental performance.

H_4: There is a significant association between green training and environmental performance.

H_5: There is a significant association between green technology and environmental performance.

Green Monetary Policy as a mediator

Climate change and the outbreak of COVID-19 have had a negative impact on our society and economy. A rapid transition to a low-carbon economy is needed to adapt and mitigate its impact. Green monetary policy has been identified by policy makers as the only tool that can reduce pollution investment and increase the profitability of green project investment. Green monetary policy is a policy and arrangement to attract green projects to green industries such as energy conservation and clean energy through green lending, green stocks and bonds, and green insurance. Studies prior to confirm that green monetary policy contributes to environmental degradation (Kala & Vidyakala, 2020; Oti & Mbu-Ogar, 2018; Liu et al., 2020; Onipe, 2018; Xi,

Wang & Yang, 2021; Nwaiwu & Oluka, 2018). According to Akomea-Frimpong et al. (2021), Green monetary policy is directly related to green equities, green investment, climate finance, carbon finance, green insurance, green credit and green infrastructure bonds. Oyedele et al. (2022) show that green monetary policy, such as raising taxes and fees, and the cost of breaching pollutants have a significant impact on environmental sustainability. Kala & Vidyakala (2020) argues that allocating sufficient funds will lead to green investment to meet the country's pollution reduction targets. Zhanget al. (2022) improve environmental sustainability by setting the prices needed for carbon emissions, defining regulatory frameworks to reduce emissions, and making the necessary sustainable investments. Therefore, the following hypotheses are proposed as follows (see Figure 1):

H_6: Green monetary policy mediates between green lending and environmental performance

H_7: Green monetary policy mediates between green investment and environmental performance.

H_8: Green monetary policy mediates between green bonds and environmental performance.

H_9: Green monetary policy mediates between green training and environmental performance.

H_{10}: Green monetary policy mediates between green technology and environmental performance.

Methodology

A survey research approach was adopted to sample the opinion of the respondents. A purposive sample technique was adopted to select 150 senior managers of the selected banks in Southwest, Nigeria. The data collection instruments for the study were structured questionnaires designed for the study and the simple percentage was employed for descriptive of demographic characteristics of the respondents, while the Structural Equation Modelling was used to test the hypotheses. All respondents were informed of data confidentiality and that information supply will be strictly used for research purposes alone. Among them, males account for 60%, while females represent 40%; the mean age of the sample was 42.5 years old. Master degree holders accounted for 30%, Bachelor degree / Higher National Diploma holders accounted for 50%, while professional certificate holders accounted for 20%; In terms of length of service, 25% of the respondents have 5-10 years, 55% have 11-20 years, while 20% have more than 20 years.

Measures

Green Finance construct was conceptualized in terms of green lending, green investment, green bonds, green technology and green training. The following scales are measured as follows:

Green Lending scale: This scalewas developed and validated by Zhang et al., (2022)and has a total of 4 items. The Likert 5-point scale was used ranging from 1 (strongly disagree) to 5 (strongly agree). The scale's internal consistency factor α was 0.88.

Green Investment Scale: This scale was developed and validated by Kala and Vidyakala (2020) and has a total of 4 items. The Likert 5-point scale was used ranging from 1 (strongly disagree) to 5 (strongly agree). The scale's internal consistency factor α was 0.89

Green Bonds Scale: This scale was developed and validated by Rehman etc., (2021)and has a total of 4 items. The Likert 5-point scale was used ranging from 1 (strongly disagree) to 5 (strongly agree). The scale's internal consistency factor α was 0.83.

Green Training Scale: This scale was developed and validated by Risal and Joshi (2018) and has a total of 4 items. The Likert 5-point scale was used ranging from 1 (strongly disagree) to 5 (strongly agree). The scale's internal consistency factor α was 0.86.

Green Monetary Policy Scale: This scale was developed and validated by Akomea-Frimpong et al (2021)and has a total of 4 items.. The Likert 5-point scale was used ranging from 1 (strongly disagree) to 5 (strongly agree). The scale's internal consistency factor α was 0.89.

Green Environmental Performance Scale: This scale was developed and validated by Miah, Rahman, and Haque (2018) and has a total of 4 items. The Likert 5-point scale was used ranging from 1 (strongly disagree) to 5 (strongly agree). The scale's internal consistency factor α was 0.89.

The scales were subjected to further item analysis to determine their psychometric soundness as indicated in Table1 below:

Table 1: Summary of Results of the Measurement Instruments Validation

Scale	No of Items	Meaning Bartlett	KMO	Eigenvalue of the principal Component	% of the Variance	α of Cronbach
Green lending	4	p = .000 (significant)	0.888	3.718	73.45%	0.81
Green investment	4	p = .000 (significant)	0.790	2.763	87.07%	0.79
Green bonds	4	p = .000 (significant)	0.867	3.208	89.51%	0.89
Green training	4	p = .000 (significant	0.891	3.127	81.60%	0.88
Green monetary policy	4	p = .000 (significant	0.872	3.378	89.79%	0.87
Green technology	4	p = .000 (significant	0.948	2.998	84.07%	0.85
Green Environmental Performance	4	p = .000 (significant	0.899	3.076	88.07%	0.86

From Table 1 above, factor loads of all the indicators are higher than 0.5 which shows that the questions highly explain the variance of their variables. This implies that the measurement model has high factor validity.

Results and Discussion

Table 2: Relationship between variables

Variables	r-value	p-value
cov(GI,GB)	.810	***
cov(GI,GTR)|	.467	***
cov(GI,GL)|	.570	***
cov(GI,GTECH)|	.339	***
cov(GB,GTR)	.505	***
cov(GB,GL)|	.757	***
cov(GB,GTECH)|	.290	***
cov(GTR,GL)|	.535	***
cov(GTR,GTECH)|	.403	***
cov(GL,GTECH)	.224	***

Table 2 depicts the relationship between independent variables. The results show that green investment has a positive and significant relationship with green bonds, green training, green lending, and green technology with r-values of 0.810, 0.467, 0.570 and 0.339, and p-value of 0.000 respectively. Evidence reveals that green bonds has a positive and significant association with green training, green lending, and green technology with r-values of 0.505, 0.535, and 0. 290, with p-value of 0.000 respectively. Similarly, the study shows that green training has a linear and significant correlation with green lending, and green technology with r-values of 0.535 and 0.403 with a p-value of 0.000 respectively. It was also revealed that green lending is significantly related to green technology with r-value of 0.224 and p-value of 0.014. (see Figure 2). This implies that green finance parameters are linearly and significantly associated.

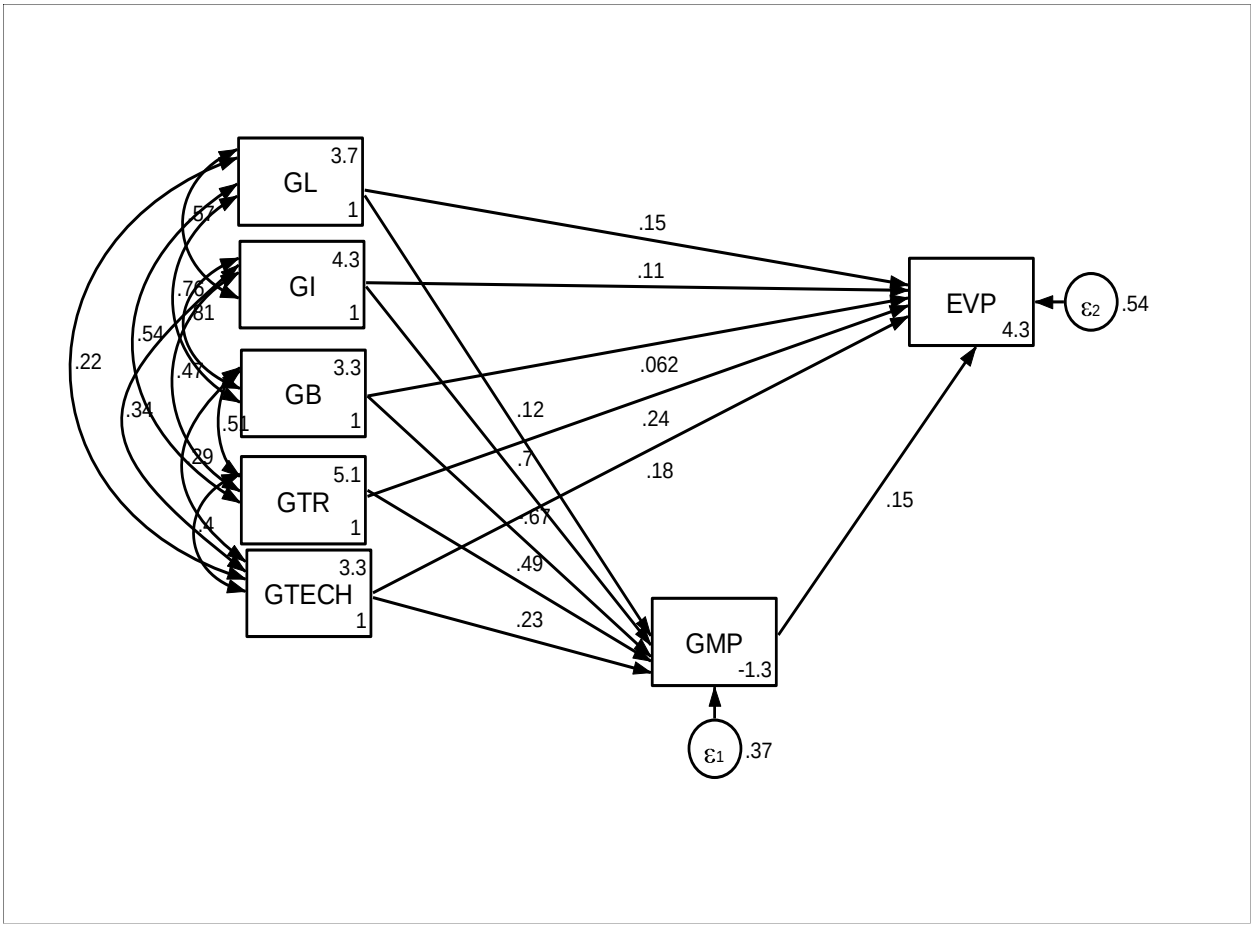

Figure 2: Structural Equation Modelling

Hypotheses Testing

The relationship between Green Finance parameters on Environmental performanceas hypothesized was examined using the SEM analysis. (see Table 3)

Table 3: Estimates of Effect of Green Finance parameters on Environmental performance

Path	Beta-value	T-value	P-value	Hypothesis
Direct Model				
EVP <- GL	.1528977	1.34	0.182	**H_1** not supported
EVP <- GI	.1103418	0.74	0.457	**H_2** is not confirmed
EVP <- GB	.0624522	0.36	0.716	**H_3** is not supported
EVP <- GTR	.2422844	2.29	0.022	**H_4** is confirmed
EVP <- GTECH	.1832154	2.21	0.027	**H_4** is confirmed

Note: GL = Green lending, GI= Green investment, GB= Green bonds, GTR = Green training, GTECH = Green technology, EVP = Environmental performance

Table 3 depicts the results of path analysis, using a standardized coefficient. The beta value of .1528977 indicates that green lending has a positive relationship with environmental performance, while the p-value of 0.182 further explains that environmental performance is not significantly influenced by green lending. This shows that green finance is still in the infancy stage in the Nigerian banking sector. The study is not in agreement with previous studies carried out in other countries, that green lending has a significant influence on environmental performance (Dziwokand-Jäger, 2021; Shaumya & Arulrajah, 2017; Kala & Vidyakala, 2020; Risal & Joshi, 2018; Akomea-Frimpongetal, 2021). Thus, **H_1** is not supported.

The beta value of .1103418 reveals that green investment has a positive correlation with environmental performance, while the p-value of 0.457 further depicts that there is no significant association between green investment and environmental performance. This connotes that financial institutions in Nigeria have not been committed to financing investment in renewable energy, waste management, and projects that are prerequisites for environmental sustainability and social acceptance. Therefore, **H_2** is not confirmed.

The beta value of .0624522 shows that green bonds have a positive association with environmental performance, while the p-value of 0.0716 further depicts that there is no significant linearity between green bonds and environmental performance. This indicates that the banking sector in Nigeria is not yet fully implementing green bonds. Hence, **H_3** is not confirmed. The beta value of .2422844 shows that green training has a positive relationship with environmental performance. The P-value of 0.022 indicates that there is a significant association between green training and environmental management. The study aligns with Rehman et al. (2021) that green training has a significant influence on environmental performance. Hence, **H_4** is supported. The beta-value of .1832154 means that green technology has a positive link between green technology and environmental performance, while the p-value of 0.027 proves that green technology has a significant relationship with environmental performance. This implies that financing online banking facilities such as ATMs, POS, mobile applications, online customer service platforms, etc has improved banks' environmental performance tremendously.

The study is in agreement with Ngwenya and Simatele (2020) that green technology has a strong impact on a bank's environmental performance. Thus, **H_5** is supported.

Table 4: Mediating role of Green Monetary Policy on the relationship between Green Finance Parameters and Environmental Performance

Path	Beta-value	T-value	P-value	Hypothesis
Indirect Model				
EVP <-GMP <- GL	.0093364	0.89	0.374	H_6: Not confirmed
EVP <-GMP <- GI	.0757324	1.27	0.205	H_7: Not confirmed
EVP <-GMP <- GB	-.0507721	-1.25	0.210	H_8: Not confirmed
EVP <-GMP <- GTR	.0564178	1.27	0.206	H_9: Not confirmed
EVP <-GMP <- GTECH	.0192302	1.21	0.225	H_{10}: Not confirmed

Table 3 reveals the mediating role of green monetary policy on the relationship between green finance parameters and environmental performance. Based on the results of the SEM analysis, and the guidelines proposed by Zhao et al., (2010), and Baron and Kenny (1998) that when the p-values of predictor and mediator are less than 0.05, partial mediation occurs. But when the p-values of predictor and mediator are greater than 0.05, mediation does not occur. Based on the above principles, green monetary policy does not mediate between green lending, green investment, green bonds, green training, green technology, and environmental performance with p-values of 0.374, 0.205, 0.210, 0.206, and 0.225 respectively. This implies that the central bank of Nigeria has not implemented a green monetary policy that will persuade Nigerian banks to finance green activities that promote environmental sustainability and a real economy.Thus, H_6, **H_7**, **H_8**, **H_9**, and **H_{10}** are not supported.

Conclusion

This study investigates the mediating role of green monetary policy on the relationship between green finance and environmental performance with specific reference to Nigerian banks. The study used a survey research approach to sample the opinion of the respondents. A purposive sample technique was adopted to select 150 senior managers of the selected banks in Southwest, Nigeria. The data collection instruments for the study were structured questionnaires designed for the study and the simple percentage was employed to describe the demographic characteristics of the respondents, while the Structural Equation Modelling was used to test the

hypotheses. The results reveal that green lending, green investment, and green bonds have a positive association with environmental performance, but are insignificant. Evidence Further reveals that green training and green technology have a significant influence on environmental performance. This indicates that training and financing electronic banking facilities such as ATMs, POS, mobile applications, and online customer service platforms, have contributed to environmental degradation.

It was also revealed that green monetary policy does not mediate between green lending, green investment, green bonds, green training, green technology, and environmental performance. it is probable that the Central bank of Nigeria has not implemented a green monetary policy that will persuade Nigerian banks to finance green activities that promote environmental sustainability and the real economy.

Theoretical Implications

The study explains the relevance of stakeholder theory to environmental sustainability and performance. The findings of the study corroborate the premise of the stakeholder theory that to achieve maximum social welfare, environmental degradation, and the real economy, the banking sector should be encouraged to finance green activities. The current study concurs with the stakeholder argument that those financial institutions must play an important role in the transition to environmental sustainability in order for society to combat climate change syndrome (Lagarde,2021). It is, therefore, established that the banking sector should avoid polluting investments from a risk perspective, and invest in sustainable investments that will create long-term value for the wider community.

Practical Implications

The study has several practical implications for Nigerian Banks, and Regulatory Authorities. Based on the findings of the study, Bank Regulatory Authorities should play an active role in combating climate change through the implementation of green monetary policies. This is necessary because climate change does not just threaten the lives of people, it also endangers macroeconomic stability by causing economic shocks. Also, Nigerian banks should start pursuing a green qualitative mitigation program that will stimulate green investment by developing and applying methods to identify and measure climate-related risks for the sector. The central bank of Nigeria should adopt a green lending policy, where banks will focus on

green lending and actively adjust their credit structure and provide special subsidized liquidity to banks that lend to green activities.

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