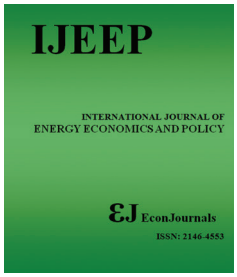

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Green Financing and SMES Performance in South Africa: Role of Environmental Management Accounting Practice

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ABSTRACT

Most small businesses avoid the implementation of environmental accounting practices due to cost implications albeit may affect the impact of green initiatives on the financial performances of small businesses. Hence, this study investigates the moderating role of environmental management accounting practices (EMAP) on the relationship between green financing and financial performance of 10 manufacturing and export oriented small caps in South Africa from 2015 to 2024. ROA is employed as the proxy for financial performance while Green Capex and Environmental accounting disclosures are the predicting and intervening variables respectively. Using Driscoll and Kraay standard error panel regression, the results show that green finance has negative and significant effect on Return on Asset (ROA). Also, the moderating role of Environmental Management Accounting Practices strengthens the impact of green finance on ROA, though with non-significant effect. The study concludes that EMAP improves the financial performance of SMEs with green initiatives. More so, green initiatives alone are not sufficient to bolster financial performance of small businesses without incorporating environmental practices. Hence, its recommended that small businesses in South Africa should integrate the use of Environmental accounting practices in their operations that aligns with financial objectives by employing standardized EMAP tools that would assist them to monitor, quantify and assess environmental cost.

Keywords: Green Finance, Environmental Management Accounting Practice, Performance
JEL Classifications: M41, Q01, Q56

1. INTRODUCTION

The propagation of achieving sustainability goals have substantially advocates the need for green finance to aid the performance of small businesses especially in developing countries. Green finance is a financial support system for achieving sustainability goals of individual firms, government and countries of the world (Z. Wang et al., 2022). It combines financial principles guiding environmental preservations and economic goals with the view of achieving sustainability at a very low cost (Zheng et al., 2021). It is a collection of financial tools such as green bonds, green loans and green investments funds to support projects or activities that are beneficial to the environment (Minhas et al., 2024). It is also an essential platform for driving the process of development in any economy (Liu et al., 2020). The role of green finance in the growth process of a firm is multifaceted as it performs different functions. It assist firms to reduce the impact of environmental exposures on their business which would give firms the opportunity to determine investment viability and potential risk that could arise from environmental cost when making financial decisions (Minhas et al., 2024). More so, by using green finance, SMEs can enjoy reduction in capital cost and even obtain them at a lower interest, thereby increase their sales and overall performance (Zhang, 2018).

Regarding the consequences of environmental degradation, South Africa is particularly vulnerable to both domestic and global climate change response strategies because the country's economy

is highly energy and carbon intensive (Montmasson-Clair et al., 2019.). However, numerous SMEs in South Africa have created workable business plans to put their significant climate mitigation and adaptation solutions into practice. Being the primary driver of the economies in Africa for sustainable development, SMEs have a significant potential to lessen poverty and inequality in addition to making significant contributions to economic production and employment. Specifically in South Africa, Small and Medium scale enterprises contribute immensely to sustainable development, poverty alleviation and economic growth (Mazanai and Fatoki, 2012). At least 90% of the manufacturing sector is made up of the SMEs while remaining 10% is constituted by export-oriented SMEs (Gimede, 2004). They boost local investments and give jobs to a significant portion of the population, improving the standard of living in communities (Creech et al., 2014). As a result, assisting Small and Medium Scale enterprises through green finance would be essential for implementing sustainable practices and enable them withstand environmental shocks.

In the context of firm performance, the impact of green finance is most beneficial to small and medium scale enterprises (Xu et al., 2023). This could be as a result of the peculiarities of the financial and sustainability issues encountered by them such as high cost of financing, inability to comply with environmental laws and the inefficiency in resource allocation (Sajuyigbe et al., 2024). Environmental laws within and international also force SMEs to be passionate about the impact of their activities in the environment (Xu et al., 2020). At every stage of development of small businesses, financing is very crucial as it could determine the survival of small business (Venkatesh and Kumari, 2012). More so, the need to reduce environmental cost by SMEs who are manufacturers and export oriented especially in developing countries, poses a huge challenge to the financial performance of the businesses, hence the need for green finance.

However, previous studies show that assess to green finance is substantially possible if SMEs could harness the use of Environmental management accounting practices to reduce environmental impact of their operations (Xu et al., 2023). Also, the effectiveness of green finance is mostly reliant on SMEs' capacity to plan and carry out environmentally friendly projects, as a result, the use of green finance by itself does not guarantee better performance (Omar et al., 2024). Moreover, for export-oriented manufacturing SMEs, which often operate under stringent environmental regulations, EMAP adoption can be particularly beneficial as small firms can invest in environmentally friendly activities and technologies by using green finance to raise the necessary funds (Nyirenda et al., 2013).

While previous studies have explored EMAP and Green Finance separately, limited research exists on how EMA influences green finance decisions and Firm performance. Specifically, most research focuses on the role of Environmental Accounting in sustainability reporting or cost management but with less attention to how it influences financial decision making such as; green bonds or ESG investments. Also, there are limited research in emerging markets. Prior studies, mainly focused on developed economies with little evidence from emerging markets where environmental policies, financial systems and corporate sustainability practices differ significantly. Moreover, while some research discuses EMAP adoption, there is limited quantitative evidence on how it impacts financial growth of manufacturing small and medium companies when integrated with green finance. Hence, this study intends to fill these gaps by investigating the moderating role of EMAP in the relationship between green finance and performance of Manufacturing Small and medium companies in South Africa.

2. LITERATURE REVIEW

1. Green Financing and Performances of Small Businesses
   Small and Medium scale enterprises are mostly attributed to lack of information that leaves them handicap financially, hence, the need for financing (Cerqueti et al., 2023). Specifically, the export-oriented manufacturing small and medium companies are choked by the environmental and international challenges that affect their performances. They have high running cost as a result of this exposure in the international front and in the pursuit of reducing environmental costs arising from the production processes such as carbon emission, sewage and other pollutants. All of this affects the performances of small and medium companies. The effect is more pronounced when these small businesses do not balance the target for financial gains with environmental protections. Consequently, the role of green finance in alleviating the environmental cost incurred by this SMEs is ever green. It is the most appropriate way out to reduce adverse environmental impact and improve performance of small businesses (Chen et al., 2023). Green finance equips SMEs with financial capabilities, motivations and expertise for overall performance (Sajuyigbe et al., 2024). This will be possible because when funds are available to support project that would reduce SMEs environmental cost or challenges such as; air pollution, carbon emissions, sewage problems, it will indirectly reflect in the financial growth of SMEs.
2. Green Finance and Moderating role of Environmental Management Accounting practices (EMAP)
   The application of environmental management accounting practices (hereafter EMAP) is important in the growth process of small businesses. EMAP is referred to as the processes and procedures taken by firms or government parastatals to alleviate the environmental impact of their day-to-day operations. They are systematic approaches adopted by these organizations to achieve sustainable development such as; adoption of waste reduction mechanisms, use of green innovations in their operations to mention but a few. It prioritizes environmental protection and efficiency in the use of firm's resources (Habib et al., 2025) To ensure compliance, the international organization for standardization (ISO) 14001 provides a framework that guides organizations on how to carry out their environmental responsibilities in a bid to achieve sustainability goals. EMAP assist SMEs to account for environmental cost and benefits on green investment in order to ensure the efficient use of green funding (Burritt

et al., 2011). Green finance is the use of financial services and product to enhance sustainable project at a lower environmental cost.

While green finance provides the funding for environmental projects of small businesses, EMAP helps to plan, implement and track the environmental impact in order to reduce cost and enhance benefits derived from such projects. So, incorporating green finance with EMA practices will improve the investment decisions of SMEs and long-term survival (Habib et al., 2025). More so, the use EMAP by SMEs will encourage financial institutions to support small companies using environmental cost tracking and embark on environmentally friendly projects. This will assure the financial institution of financing viable projects that aligns with environmental laws and standards. As a result, the availability of this green funding will boost the financial performance of the small businesses especially in emerging countries. Surprisingly, studies show that SMEs are still far from adopting sustainable practices which has denied them access to adequate green financing to ensure better performances. Hence, the study intends to empirically determine how EMAP can moderate the impact of green finance on financial performance of small and medium companies.

2.1. Theoretical Framework and Hypotheses Development

This study is built on the theoretical foundation of resource based view and institutional theory. Barney (1991) established the Resource Based View (RBV), which holds that a firm's strategic resources that are valuable, scarce, unique, and non-substitutable have an impact on its performance. In this study, green financing, which encompasses concessional loans, sustainability-linked credit, and green bonds, can be considered a strategic external resource. SMEs can obtain funding designated for ecologically friendly operations when they apply for green finance. Hart (1995) added that when green initiatives are used efficiently, it can improve market competitiveness, lower long-term expenses, and increase operational efficiency. Nevertheless, it is not always possible to obtain performance advantages from green finance. Companies need complementary internal capabilities, including Environmental Management Accounting Practices (EMAP), to monitor environmental costs, assess the sustainability results of their investments, and allocate green funds efficiently (Schaltegger and Burritt, 2018). EMAP, thus, is a moderating factor that improves the firm's capacity to transform green financial inputs into performance benefits, according to Resources based theory. Considering the institutional theory developed by DiMaggio and Powell (1983), it describes how external forces, including laws, social conventions and industry expectations, influence organizational behavior. Green financing is becoming more accessible and in greater demand as a result of the increased institutional focus on sustainability in recent years. In reaction to normative pressures to meet customer expectations, mimetic pressures from imitating competitors, or coercive pressures that stems from environmental restrictions, SMEs may seek green finance. Under these circumstances, EMAP serves as an internal institutional mechanism that assists SMEs in bringing their operations into compliance with changing market and regulatory norms. SME compliance with green finance regulations and environmental performance monitoring are enhanced by incorporating environmental accounting into daily operations, which also strengthens financial performance. Hence the study hypothesizes that:

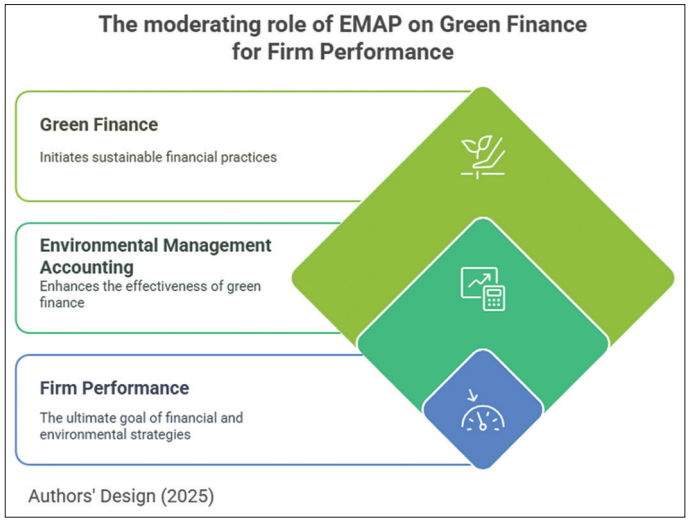
- Hypothesis one
  Green Finance has significant impact on the financial performance of Manufacturing Small and Medium cap companies in South Africa.
- Hypothesis two
  Environmental management accounting practices strengthens the influence of green finance on financial performance of Manufacturing Small and Medium cap companies in South Africa.

2.2. Conceptual Framework

The relationship between Green Finance, Environmental Management Accounting (EMAP), and Firm Performance is illustrated in the diagram in Figure 1. Green finance contributes to the adoption of sustainable financial practices, but how efficiently environmental costs and benefits are managed will determine how strongly green finance affects business performance. This is where EMAP comes into play, serving as a link that makes green financial methods more effective.

By giving businesses the means to quantify and evaluate financial and environmental data, EMAP guarantees that sustainability initiatives are not merely theoretical but result in tangible advancements. The graphic illustrates how Green Finance could not be sufficient on its own and that EMAP's assistance is necessary for it to be fully successful. Businesses may find it difficult to realize the real returns on their green investments without EMAP, which could result in inefficiencies. The diagram's well-organized flow emphasizes how one element affects the others, supporting the notion that a robust environmental accounting system improves corporate results (Deb et al., 2023). In order for organizations to maximize their sustainability efforts, the figure highlights the necessity of integrating Green Finance with environmental management systems. Businesses who adopt this strategy successfully have a higher chance of long-term financial

Figure 1: A conceptual framework on the relationship between, green finance, environmental management accounting and performance



and environmental success. The idea that Green Finance (green) must first be handled through EMAP (teal/blue-green) before it may result in enhanced Firm Performance (blue) is visually reinforced by the color transition. The significance of incorporating environmental management techniques for financial success is emphasized by this color progression (Homan, 2016).

2.3. Review of Related Studies

The inclusion of sustainability goals in the overall objectives of firms is gradually becoming a norm due to its impact on the long-term efficiency of a firm. As a result, the need for sustainability finance is increasing tremendously most especially in developing countries. Studies show that green finance performs pivotal role in enhancing the growth of a firm (Fan et al., 2024). As instance, Agrawal et al., (2024) assert that it helps a system transit to a low carbon economy by making sufficient capital available to firms in pursuit of sustainability. This is supported in the works of (Fan et al., 2024) on how green finance leads to the reduction of pollution and carbon in China industrial from 2008 to 2015. It was discovered that green finance reduces air and carbon pollutions significantly. The impact is attributable to the availability of green funding for the firm's project. Tang and Zhang (2020) added that the issuance of green bond boost the performance of some selected Chinese firms. It further suggests that the utilization of green finance coupled with environmental regulations encouraged more investors and improve the market value of the firms. Ashfaq et al., (2024) opines that the utilization of green funding by firm may assist in the efficient management of resources and at the same time resolve social and environmental problems. Also, Oyedele et al., (2022) revealed that green loans improve environmental performance of Nigerian banks understudied. In another study on the impact of Green finance on sustainability performance, Fan et al., (2024) added that green finance reduces financial constraint of firms and boost their productivity. The study also emphasized further on its effect on local firms and discovered that green bonds exert significant impact by increasing their productivity and asset structure.

Considering the impact of green finance on Small firms, Zhang (2018) investigated the performance and risk exposure of Chinese SMEs and the influence of green credit. It is discovered that green credit improves SMEs' performance. Also, green loans and green technology has significant impact on the environmental performance of manufacturing SMEs (Sajuyigbe et al., 2024). This suggests that manufacturing SMEs need green loan and technology to achieve their sustainability and financial goals. However, green investment and training exert and insignificant but positive impact on environmental performance of SMEs in Nigeria. In Malaysia and Indonesia, the influence of green finance on financial sustainability performance of SME was investigated in the works of Abidin et al., (2024). The results show that green finance plays crucial roles in achieving the sustainability goals of SMEs. It further suggests that the accessibility of green finance by SMEs will reduce their operational cost and improve financial viability.

In as much as green finance is important in the growth process of SMEs, several factors have been identified to reduce its significance. For instance, Oyedele et al., (2022) noted that most banks have not been involving in funding investment in projects that bolsters environmental sustainability. Venkatesh and Kumari, (2012) had similar notion that limited access to green finance by SMEs truncates the performance of SMEs. This maybe explainable by the informal and risky nature of the SMEs as viewed by the financial institutions. Even burdensome collateral security could exclude SMEs from accessing sustainability finance (UNEP, 2022). Green technologies and environmental compliance come with a large upfront cost and a lengthy return time, which are major arguments against their positive effects. A study on Chinese companies, for instance, discovered that the cost of equity increased dramatically with increased investment in green innovation, as measured by the number of green patents (Alkebsee et al., 2023).

Adoption of EMAP, especially through water efficiency measures and recycling practices, was strongly linked to improved environmental outcomes, according to the analysis of Nyahuna and Swanepoel, (2022) for 45 JSE-listed cement and mining companies. The study indicated that operational environmental benefits might result in long-term cost savings and financial resilience, even if it did not directly link higher profitability to these improvements. Likewise, Nzama et al., (2022) looked into environmental accounting procedures used by food and beverage companies in Durban. The study found that companies using EMAP had better reputational standing, better alignment with corporate environmental initiatives (such plastic pollution prevention), and stronger environmental transparency. EMAP, transparency, and stakeholder involvement have a positive association that suggests possible financial benefits through increased market trust and brand equity, even if direct financial measures were not evaluated. In a study of manufacturing companies in Bangladesh, Deb et al., (2023) discovered that EMAP greatly improved both financial and environmental performance. By promoting process efficiency and

Table 1: Description and measurement of variables

Variable	Description	Measurement	Source
ROA	Return on Asset	PBIT/total asset	Financial report
GC	Green Capex	Total % of capital expenditure on green initiatives (energy efficiency, carbon reduction, sustainable packaging, emission reduction)	Integrated and sustainability report
EMAP	Environmental Management Accounting Practices	Environmental Disclosure score	Bloomberg terminal
Firm size	Size of the firms in terms of total assets owned.	Total asset (TA)	Bloomberg terminal
Leverage	Debt to total equity	Total debt/total equity	Bloomberg terminal
Time specific factor	Macroeconomic shock	South African Exchange rate	Bloomberg terminal

Source: Authors computation (2025)

innovation-led growth, their model which included environmental information systems and green innovation as mediators showed how structured accounting procedures can provide value above and beyond compliance. Similar findings were obtained in a Malaysian context by Fuzi et al., (2019), who emphasized that EMAP's efficacy is increased when integrated into larger Environmental Management Systems (EMS). Findings from the study indicates that the use of EMAP to boost performance may not be significant unless it is complemented by established protocols that aids accountability and long-term efficiency. Similarly, Obioha (2024) corroborated that the utilization of corporate sustainability practices by businesses in South Africa can improve their competitive advantage which will bolster financial outcomes.

However, in order to improve the significance of green finance, Li and Lin, (2024) noted that the significance of green finance allocation is subject to the mediating role of research and development innovation which in turn improves the financial output of the firms. Using a two-step dynamic GMM method, Ashfaq et al., (2024) identified the role of competitive edge as a good moderating factor to enhance the significance of Green finance on firm financial performance. L. Wang et al., (2023) established that corporate governance is another factor in determining the accessibility of SMEs to green finance by conducting research on Chinese's manufacturing SMEs. The study reveals that firms with good governance structure benefits from green funding, resulting to better environmental sustainability.

From, the review of prior studies, it can be deduced that most of the studies concentrated on sustainable performance with little or no attention to financial performance of Manufacturing Small and Medium companies particularly in South Africa. Also, the moderating role of environmental management accounting practices of firms on the relationship between green finance accessibility and Manufacturing SMEs' performance has not received sufficient attention by prior researchers. These constitute the novel contribution of this study.

3. MATERIALS AND METHODS

3.1. Data Collection and Estimation Techniques

This study employs a quantitative research design by using panel data of some selected small cap Manufacturing firms listed on JSE from 2015 to 2024. Data are extracted from the integrated and sustainability report of ten manufacturing small cap companies based on the following criteria:

i. They must be classified as small cap companies by JSE
ii. Integrated and sustainability reports for the period understudied must be available.
iii. the companies must be a manufacturing company that is export-oriented.
iv. They must be firms with green finance practice and environmental management accounting practices.

For the purpose of analysis, panel regression analysis is employed for the control of both firm specific heterogeneity and time variations. Fixed and random effect regression models are utilized while Hausman test is employed to determine the suitable specification for the purpose of interpretations and recommendation. In order to correct the problem of serial correlation, heteroskedastic, and cross-sectional dependency in the model, the study employed panel regression analysis using Driscoll -Kraay Standard error estimator. This estimator also gives more reliable results for inferences on the relationship between variables in the regression model (Hoechle, 2007).

3.2. Model Specification

Model 1:

To determine the impact of green financing on financial performance, the panel regression model is specified thus:

$$roa_{it} = \beta_0 + \beta_1 gc_{it} + \beta_2 emap_{it} + \beta_3 ta_{it} + \beta_4 dte_{it} + \beta_5 exchr_{it} + \varepsilon_{it} \quad (1)$$

Model 2:

To ascertain the moderating role of Environmental management accounting practice on the relationship between green finance and financial performance of firm, the model is specified as follows:

$$roa_{it} = \beta_0 + \beta_1 gc_{it} + \beta_2 (gc \times emap)_{it} + \beta_3 ta_{it} + \beta_4 dte_{it} + \beta_5 exchr_{it} + \varepsilon_{it} \quad (2)$$

Table 1 reports the variables employed in this study. Where roait is a proxy of financial performance of the firms at time t which measures the rate of return generated from the use of the total assets of the firms. Prior studies (Homan, 2016; Li and Lin, 2024) find return on asset to be reliable in measuring financial performance. Green finance is the independent variable for this study proxied by green capex (gc_{it}), it is the total percentage of capital expenditure on energy efficiency, sustainable packaging, carbon reporting and emission reduction of the firms harnessed through Internal sources, financial institutions and government grants. Each component is extracted from the firms' integrated reports and expressed as a percentage of total annual capital expenditure. The study of Li and Lin (2024) also validates the use of green capex as a proxy for green financing in the study. Environmental management accounting practices ($EMAP_{it}$) measures the extent of environmental management accounting practices of the firms, proxied by Environmental disclosure score while $(gc \times emap)_{it}$ is the moderating variable. This was also found reliable in the works of Festus and Akinselure, (2017).

The control variables are total asset (ta_{it}) and Debt to total equity ratio (dte_{it}) at time t for each of the firm. These variables are employed to account for firm size and leverage level of the various firms at time t. Previous studies observed that the size of a firm and leverage ratio determines its level of performance (Moussa et al., 2020; Pham et al., 2021). To account for time specific factors, this study uses exchange rate ($exchr_{it}$) as a factor that have same effect on all the firms in a given time. It is used as a control for macroeconomic conditions or external shock.

4. RESULTS AND DISCUSSIONS

Table 2 shows that the average return on asset (ROA) is 1.3% ranging from −36.54% to 26.03%, indicating that there is a

significant change in the financial performance of the firms which is also confirmed by rate of standard deviation of 8.97%. The average value of environmental management accounting practices (EMAP) is 14.51, with a significant standard deviation, indicating inconsistent adoption of EMAP across enterprises, whereas the mean value of green credit (GC) is 15.61, indicating the amount of green financial support received by SMEs. The firms have a range of sizes, with an average total asset (TA) of ZAR 12,937.61 million. Additionally, leverage (DTE) varies a lot, suggesting that different SMEs have different financial arrangements. The exchange rate (EXCR) was comparatively steady throughout the period.

The result in Table 3 indicates a weak and negative relationship between ROA and green finance (r = −0.245), indicating that a rise in green finance is linked to a drop in firm performance. ROA and the debt-to-equity ratio have a larger negative association (r = −0.499), suggesting that lower performance is associated with more leverage. Remarkably, EMAP has a substantial positive connection (r = 0.686) with company size (TA), suggesting that larger firms are more likely to use environmental management accounting techniques, whereas it has a weak and negative association with both ROA and GC. The correlation result also reveals that there exist a negative and weak relationship between ROA and Exchange rate. The summary of the results establishes that there is absence of autocorrelation problem among the variables since the value of all the correlation coefficient is less than 0.80.

Table 2: Descriptive analysis

Variables	Mean	Median	Maximum	Minimum	Std deviation
ROA	1.300	2.648	26.030	−36.548	8.968
GC	15.61	15.800	23.000	8.4000	3.2980
EMAP	14.51	10.631	47.206	0.0000	15.7299
TA	12936.61	9954.67	31196.0	2604.745	7696.49
DTE	69.411	50.469	452.674	0.0000	80.547
EXCR	15.288	14.749	18.452	12.772	1.94

Source: Authors' computation (2025)

Table 3: Correlation analysis

Variables	ROA	GC	EMAP	TA	DTE	EXCR
ROA	1					
GC	−0.2448	1				
EMAP	−0.1178	−0.126	1			
TA	−0.2947	−0.143	0.686	1		
DTE	−0.4987	0.198	0.009	0.262	1	
EXCR	−0.1627	0.055	0.118	−0.035	0.226	1

Source: Authors' computation (2025)

From the Fixed and random effects results in Table 4, green finance has a statistically significant negative impact on SME performance (β = −0.459, P = 0.097, β = −0.522, P = 0.055), showing that an increase in green capital expenditure will result to a drop in returns on total assets significantly. This may be attributable to inefficient use of funds or the short-term costs of green initiatives. Conversely, EMAP and ROA have a positive but statistically negligible association, suggesting that environmental accounting techniques by themselves might not substantially improve SME performance. The significant and negative effect of the debt-to-equity ratio (β = −0.035, P = 0.015, β = −0.042, P = 0.001), indicates that highly leveraged SMEs typically have poor performance. Firm size (total assets) only has a negative and significant influence in the random effects model, suggesting that higher size may not always translate into better performance. Also, in both model, exchange rate has negative and significant effect on ROA. The use of the random effects model for the purpose of conclusion and recommendation is supported by the Hausman test (χ^2 = 0.6301, P > 0.05).

Table 5 presents the fixed and random effect regression results that include the interaction term between EMAP and green finance. It is clear that in both model EMAP does not significantly alter the association between green finance and SME performance because the interaction effect (GC × EMAP) is positive but not statistically significant (β = −0.00406, P = 0.24, β = −0.003, P = 0.305). Green finance continues to have a negative and significant effect (β = −0.515, P = 0.085, β = −0.566, P = 0.052), supporting previous findings that they may initially limit profitability. While firm size continues to have a weakly significant impact on ROA under the random effects specification, leverage continues to have a considerable negative impact. Also, in both model, exchange rate has negative and significant effect on ROA. However, for the purpose of conclusions and recommendations, the Hausman test confirms that the random effects model is more appropriate (χ^2 = 0.7210, P > 0.05).

4.1. Robustness Check

To ensure the main results of this study is free from the problem of endogeneity and not model biased, a robustness check using two-stage least square with instrumental variables was carried out. The results of the two-stage least square in Table 6 confirms the result of the main findings that green finance exerts a negative

Table 4: Regression with Driscoll-Kraay standard errors

Variable	Fixed effect			Random effect		
	Co-efficient	Drisc/kraay Std. error	P-value	Co-efficient	Drisc/kraay Std. error	P-value
GC	−0.459	0.248	0.097***	−0.522	0.236	0.055***
EMAP	0.077	0.066	0.277	0.061	0.053	0.276
TA	0.00003	0.0005	0.841	−0.0003	0.0001	0.023**
DTE	−0.035	0.011	0.015**	−0.042	0.009	0.001*
EXCHR	−0.452	0.239	0.092***	−0.421	0.213	0.079***
C	16.272	6.549	0.035**	22.311	4.218	0.001**
R^2		0.189			0.324	
Hausman test (Chi square)					0.6301 (3.46)	

*,**,***Denotes significant levels at 1%, 5%, 10% respectively. Source: Authors' computation (2025)

Table 5: Regression with Driscoll-Kraay Standard errors. (Moderator effect)

Variable	Fixed Effect			Random Effect		
	Co-efficient	Drisc/kraay Std.error	P-value	Co-efficient	Drisc/kraay Std. error	P-value
GC	−0.515	0.267	0.085***	−0.566	0.253	0.052***
GC×EMAP	0.00406	0.003	0.240	0.003	0.0029	0.305
TA	0.00005	0.0001	0.745	−0.0003	0.00016	0.076***
DTE	−0.036	0.012	0.018**	−0.0422	0.0093	0.001*
EXCHR	−0.432	0.217	0.078***	−0.403	0.195	0.068***
C	16.819	6.571	0.031**	22.694	3.673	0.000*
R^2		0.187			0.323	
Hausman test (Chi square)					0.7210 (2.86)	

*,**,***Denotes significant levels at 1%, 5%, 10% respectively. Source: Authors' computation (2025)

Table 6: Two stage least square with instrumental variable for model 1

Variables	Co-efficient	Std. Error	P-value
GC	−2.141	0.979	0.0325
EMAP	0.422	0.376	0.266
TA	−0.0009	0.0005	0.065
DTE	−0.011	0.0178	0.535
EXCR	−2.329	1.864	0.216
Constant	78.322	34.67	0.027

*,**,*** denotes significant levels at 1%, 5%, 10% respectively. Source: Authors' computation (2025)

Table 7: Two stage least square with instrumental variable for model II

Variables	Co-efficient	Std. Error	P-value
GC	−2.62	1.216	0.034
GC*EMAP	0.017	0.025	0.498
TA	−0.0007	0.0005	0.179
DTE	−0.013	0.019	0.516
EXCR	−2.640	2.220	0.239
Constant	91.054	43.404	0.0399

*,**,***Denotes significant levels at 1%, 5%, 10% respectively. Source: Authors' computation (2025)

and significant effect on the performance of small businesses in South Africa.

In addition, the positive and significant moderating effect of Environmental management accounting practice in the main findings and robustness check result in Table 7 shows that after the issue of endogeneity is addressed, Environmental management accounting practice, strengthens the relationship between green financing and SMEs performances though insignificantly.

4.2. Discussion of Findings

The impact of green financing on the performance of small and medium companies is investigated in this study with the moderating role of environmental management accounting practices. The result reveals that green capital expenditure has significant adverse effect on performance of small and medium enterprises. This supports the assertion that although green investments are crucial for long-term sustainability, they sometimes come with high upfront expenditures that can negatively impact short-term financial performance, particularly for SMEs with limited resources. This is in tandem with the studies of Li and Lin, (2024) that green finance significantly influence corporate performance of firms. This further affirms the hypothesis of this study that green finance has significant impact on financial performance of SMEs in South Africa. The non-significant but positive impact of EMAP as a moderator and a direct predictor suggests that SMEs in the sample have not yet adopted environmental management accounting standards, which could have a substantial impact on improving financial results or changing the effects of green finance. This study is in consonance with the findings of Agyemang et al., (2023) which asserts that environmental accounting disclosure has positive but insignificant impact on returns on total asset. This finding might be a reflection of the early stages of environmental accounting integration in many SMEs, particularly in developing economies where awareness, training, and regulatory demands are still developing. Hence, the hypothesis that environmental accounting practices strengthens the impact of green finance on firm performance is accepted in this study.

Furthermore, ROA is negatively and significantly impacted by the debt-to-equity ratio (DTE), in both models, highlighting the financial dangers connected to high leverage. This indicates that profitability may be compromised for too leveraged SMEs if they are unable to pay off debt and engage in green projects at the same time. More so excessive use of debt by a firm can be counterproductive if it is not effectively managed (Li and Lin, 2024). Also, a negative and significant relationship between ROA and firm size (TA) in both models, suggests that size by itself does not always translate into higher returns, and larger businesses may experience underutilized capacity or inefficiencies brought on by complexity. In both models, the exchange rate (EXCR) continuously shows a negative significant correlation with ROA. This implies that SMEs may face additional financial challenges due to changes or depreciation in the local currency, especially if they depend on imported equipment or materials for green capital projects. A declining exchange rate raises input costs and lowers profitability, particularly when revenues are produced in local currency and expenses are dollar-linked. This effect highlights how crucial macroeconomic stability is to assisting SMEs in making the transition to sustainability.

5. CONCLUSION

The influence of green financing on the financial performance of SMEs was examined in this study, with an emphasis on the moderating effect of Environmental Management Accounting Practices (EMAP). The result shows that while green investment is essential for long-term sustainability, it may have a negative

and significant impact on SMEs' short-term profitability. The high upfront expenses and protracted payback times linked to ecologically sustainable capital projects are probably the cause of this outcome. Additionally, EMAP showed little discernible direct or moderating influence on SME performance, despite its conceptual significance. This implies that the use of EMAP by small and medium companies in South Africa is either rudimentary or incompletely incorporated into financial decision-making procedures. However, the positive influence of Environmental accounting practices in moderating the impact of green financing on financial outcome reveals that small businesses in South Africa can improve the financial performances of their green initiatives by reducing environmental cost. The debt-to-equity ratio is another important factor that contributed to the performance hazards associated with excessive leverage showing a continuous negative and considerable influence on ROA. Furthermore, the consistent and significant downward trend of exchange rate indicates that the majority of small businesses, especially those investing in imported green technologies, are susceptible to macroeconomic volatility. All of the results indicate that in order to support the successful green transitions for small and medium companies, innovative finance architecture, enabling legislative frameworks, and enhanced SME capabilities are required.

5.1. Practical Implication of Findings

The results of this study have significant implications for financial institutions, policy makers, and management of SMEs that want to improve environmental sustainability without sacrificing business performance. Green investments are environmentally beneficial, but they may put short-term strain on small businesses' financial resources, as seen by the substantial inverse relationship between green financing and SME profitability. This suggests that small and medium companies should prioritize green capital expenditures that aligns with the financial goal. This will prevent overspending on green initiatives that are capital intensive without a commensurate financial performance. Additionally, the study shows that Environmental Management Accounting Practices (EMAP) have not yet shown a substantial impact in moderating the relationship between green financing and financial outcome, though strengthens the relationship. This suggests that many SMEs do not have the mechanisms or the knowledge necessary to incorporate environmental data into essential financial procedures. Interventions aimed at increasing capacity are therefore urgently needed. SMEs' capacity to monitor, quantify, and assess environmental expenses in ways that are consistent with more general financial objectives may be improved through training courses, workshops, and standardized EMAP tools. The steadily detrimental effect that leverage (DTE) has on business performance highlights the significance of careful financial planning, particularly while making green investments. When income generation is delayed, as is sometimes the case with green projects, an excessive reliance on debt might jeopardize a company's profitability. SMEs would gain from having access to hybrid financing options that lessen reliance on debt while promoting green transformation, equity financing, or concessional loans. More so, the negative and significant effect of exchange rate on the financial performance of the firm shows that the financial performance of the manufacturing and export oriented small companies are vulnerable to exchange rate fluctuations in South Africa, especially the small business that rely on imported raw materials and technology. Hence, South African government should intervene by granting foreign exchange support and green investment insurance to reduce the exposure of these small and medium companies from external shocks.

5.2. Limitations and Suggestions for Further Studies

This study is limited by the availability of financial disclosure among unlisted SMEs in South Africa, hence the utilization of small cap companies that are listed on the Johannesburg Stock exchange as proxies for SMEs in this study. Though the firms selected for this study reflects the nature of the unlisted SMEs in terms of asset base, number of employees and constrained capital, further studies could use qualitative data such as in-depth interviews of unlisted SMEs to provide a better insight on the influence of EMAP adoption on the relationship between green financing and financial performance of SMEs in South Africa. More so, a comparative analysis could be carried out between the Listed and Unlisted SMEs in South African context.

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