ISRG Journal of Arts, Humanities and Social Sciences (ISRGJAHSS)

ISRG PUBLISHERS
Abbreviated Key Title: ISRG J Arts Humanit Soc Sci
ISSN: 2583-7672 (Online)
Journal homepage: https://isrgpublishers.com/isrgjahss
Volume – I Issue-VI (November – December) 2023
Frequency: Bimonthly

ESG performance, auditing quality and investment efficiency: Empirical evidence from Ghana

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| **Received:** 13.11.2023 | **Accepted:** 16.11.2023 | **Published:** 27.11.2023

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Abstract

The dynamic shifts occurring in the corporate landscape have generated a need for supplementary information, including management conversations, governance details, and financial statement comments, which are beyond the scope of conventional financial reporting. The utilisation of environmental, social, and governance (ESG) data has the potential to foster stakeholder confidence, diminish transaction expenses, and enhance investment effectiveness. This study examines a sample of listed enterprises in Ghana from 2013 to 2022. The Hausman test was conducted to determine the appropriate model for analysis, and the random effect model was selected as the estimator. The findings derived from the implementation of the random effect model indicate a statistically significant positive relationship between ESG performance, auditing quality, and investment efficiency within the context of listed companies in Ghana. Hence, this study makes a valuable contribution to the current body of literature about environmental, social, and governance (ESG) performance. Additionally, it offers relevant sources for ESG implementation and the promotion of sustainable corporate growth in other emerging economies

Keywords: *ESG performance, Auditing quality, Investment efficiency, Hausman test, Random effect model.*

1. Introduction

ESG comprises the integrated components of environmental, social, and governance concerns. The integration of environmental, social, and governance (ESG) data into nonfinancial reporting is a fundamental component that enhances and supplements conventional financial reporting. The scholarly literature emphasises the significance of disseminating environmental, social, and governance (ESG) information, as it has been demonstrated to enhance the decision-making capabilities of stakeholders (Zhang et al., 2020). Investors hailing from industrialised nations exhibit an increased emphasis on environmental, social, and governance (ESG) factors. Cheng et al. (2014) assert that the growing influx of foreign investment in Ghana has prompted domestic companies to prioritise the enhancement of their environmental, social, and governance (ESG) practices and reporting. The development of the environmental, social, and governance (ESG) ecosystem in Ghana is still in its nascent phase. Prior to the establishment of comprehensive standards or frameworks for addressing environmental, social, and governance (ESG) problems, Ghana primarily depended on occasional provisions within existing legislation that briefly

DOI: 10.5281/zenodo.10208900

touched upon ESG concerns. The Environmental Protection Agency Act of 1994 provides a clear illustration of this provision. Furthermore, in accordance with the Minerals and Mining Act of 2006, some legislative rules, particularly those relevant to the oil and gas and mining industries, necessitate the generation of reports with environmental, social, and governance (ESG) dimensions. However, the primary focus of this research predominantly revolves around the environmental aspect within the framework of environmental, social, and governance (ESG). Numerous sector-specific laws have been enacted to oversee and regulate corporate governance practices across several domains. The regulatory frameworks mentioned above consist of the Securities and Exchange Commission (SEC) Code for Listed Companies (2020), the Bank of Ghana (BoG) Corporate Governance Directive of 2018, the BoG Corporate Governance Directive for Rural and Community Banks (2021), the draft State Interests and Governance Authority (SIGA) Code, and the Public Services Commission Code. The notion of environmental, social, and governance (ESG) has garnered significant interest, particularly among scholars who have predominantly concentrated on investigating the correlation between ESG performance and corporate value (Malik, 2015; Qureshi et al., 2019). However, there remains a lack of agreement among scholars and professionals regarding the relationship between environmental, social, and governance (ESG) performance and the effectiveness of investments. Consequently, doing research on the impact of environmental, social, and governance (ESG) performance on investment efficiency has the potential to significantly contribute to the existing body of knowledge on ESG within the academic realm. Furthermore, this study provides theoretical frameworks that can be employed by Ghanaian enterprises in their endeavours to enhance investment efficiency. The main aim of this research is to analyse the notion that positive ESG (environmental, social, and governance) performance has the potential to enhance investment efficacy. Additionally, the findings indicate that audit quality partially mediates the connection between environmental, social, and governance (ESG) performance and investment efficiency. There are two main justifications for the possible beneficial effects of strong environmental, social, and governance (ESG) performance on organisations. The main aim of enacting this strategy is to effectively tackle financial limitations and improve the accessibility of external funding alternatives for enterprises (Liu et al., 2021). Furthermore, scholars have posited that the implementation of this specific methodology has the capacity to decrease agency costs and bolster the oversight and regulation of management conduct (Lee and Kim, 2020). The practice of participating in social responsibility projects has been shown to yield notable benefits, such as the involvement of stakeholders in the decision-making processes of organisations and the reduction of information asymmetry (Cui et al., 2018; Samet & Jarboui, 2017).

These activities have the potential to enhance investment efficiency. Enterprises that exhibit strong environmental, social, and governance (ESG) performance often choose high-quality auditing practices as a means to provide positive signals to external stakeholders and mitigate information asymmetry within the organisation (Kim and Song, 2011). The enhancement of audit quality has the potential to enhance investment efficiency, providing additional evidence of the mediating effect of audit quality in the association between ESG performance and investment efficiency.

The present study aims to employ panel regression analysis on a sample of Ghanaian companies registered on the stock exchange market, covering the period from 2013 to 2022. The evaluation of ESG performance is conducted through the utilisation of the ESG score derived from the database of the Ghana stock exchange market.

This study presents several contributions to the existing body of literature. The majority of existing research primarily examines a singular ESG dimension, such as the environment, social responsibility, or corporate governance. However, there are a limited number of studies that consider all three dimensions collectively. This study employs a comprehensive analytical framework that incorporates environmental, social, and governance components to examine the influence of Ghanaian enterprises' ESG performance on investment efficiency. The research emphasizes the overarching significance of ESG factors in enhancing investment efficiency. Furthermore, the majority of existing literature on environmental, social, and governance (ESG) factors primarily examines their impact on business value and financial performance rather than their influence on investment efficiency. This study adds to the existing body of research by emphasizing the correlation between environmental, social, and governance (ESG) factors and investment efficiency.

2. Literature review and hypothesis development

2.1. ESG performance and investment efficiency

Stakeholder theory posits that the adoption of environmental, social, and governance (ESG) practices contributes to the enhancement of stakeholder trust, the acquisition of stakeholder support, the procurement of strategic resources for business advancement, and the enhancement of investment efficiency (Liu et al., 2021). ESG performance enhances investment efficiency through three distinct mechanisms. Firstly, the implementation of environmental, social, and governance (ESG) practices has been found to effectively mitigate agency costs. According to Lee and Kim (2020), a strong ESG performance suggests that companies possess a robust corporate governance framework, which effectively limits managerial discretion and addresses agency conflicts. According to Matten and Moon (2008), the presence of positive environmental, social, and governance (ESG) information serves to mitigate the adverse impact of media coverage, alleviate external pressures, lower agency costs, and enhance investment efficiency. According to Samet and Jarboui (2017), the adoption of ESG investments has the potential to decrease corporate free cash flow and limit management myopia, resulting in a reduction of agency costs and an enhancement of corporate investment efficiency.

Furthermore, the performance of environmental, social, and governance (ESG) factors has the potential to enhance investment efficiency through the alleviation of funding limitations. The disclosure of environmental, social, and governance (ESG) information serves as a means of conveying nonfinancial data to investors and plays a role in enabling external funding opportunities (El Ghoul et al., 2011). According to Kim et al. (2012), the publication of environmental, social, and governance (ESG) information also serves to enhance external oversight and scrutiny, facilitate access to information for ignorant investors, and mitigate the synchronisation of stock prices. Moreover, the approval of corporate refinancing in substantially polluting

DOI: 10.5281/zenodo.10208900

industries is closely linked to the performance of social responsibility (Goss and Roberts, 2011). Ultimately, the disclosure of environmental, social, and governance (ESG) information conveys a favourable indication to the financial market. According to Spence (1973), organisations typically allocate a certain budget for the dissemination of nonfinancial information to the public. This practice serves to mitigate information asymmetry and aid investors in discerning high-quality firms. According to Lins et al. (2017), a strong performance in environmental, social, and governance (ESG) factors can mitigate the information asymmetry that exists between firms and investors. This enhanced performance also offers stakeholders more comprehensive information, enabling them to make better-informed decisions. Consequently, this reduction in decision-making risk for investors leads to an improvement in investment efficiency. Therefore, we put forth the subsequent hypothesis.

H1: ESG performance positively influenced investment efficiency.

2.2. Auditing quality and investment efficiency

The presence of rapid economic growth and the enhancement of capital markets do not necessarily imply a corresponding increase in investment efficiency. Ghanaian listed businesses encounter significant challenges pertaining to inefficient investment, encompassing both overinvestment and underinvestment (Qin and Song, 2009; Chen S. et al., 2011). Based on the principal-agent theory, an excessive concentration of power among managers can potentially give rise to myopic behaviour, resulting in a disregard for the long-term interests of the enterprise. This can further lead to excessive investments and an uneven and irrational allocation of resources, ultimately resulting in the wastage of enterprise resources and an escalation in operational risks (Li, 2009; Chen et al., 2017). On the contrary, when the authority of management is excessively limited by external variables, it might lead to a tendency towards conservative investment practices, ultimately leading to inadequate levels of investment. Insufficient investment has the potential to result in idle resources, elevate the opportunity cost of firms, and adversely impact the rights and interests of stakeholders (Stulz, 1990; Bertrand and Mullainathan, 2003). Enhancing investment efficiency has emerged as a pressing issue requiring resolution.

The lack of investment efficiency can typically be attributed to the presence of information asymmetry and principal-agent conflicts. The enhancement of information transparency can be achieved by the utilisation of high-quality accounting information (Biddle and Hilary, 2006; Biddle et al., 2009). The practice of auditing serves as a means to ensure the reliability and accuracy of accounting information, hence offering significant insights and guidance for stakeholders. The impact of auditing quality on investment efficiency can be observed through three distinct channels. According to Copley and Douthett (2002), the practice of auditing has the potential to mitigate information asymmetry, decrease the level of risk associated with investors' decision-making processes, and enhance investment efficiency by means of the signal transmission mechanism. Furthermore, it has been found that a higher level of auditing quality is associated with a decrease in financing costs, as supported by the studies conducted by Mansi et al. (2004) and Lambert et al. (2007). The enhancement of auditing quality has been found to have a positive impact on investors' confidence in financial information, as well as addressing information asymmetry and mitigating the adverse effects of high financing costs, ultimately leading to improvements in investment efficiency (Bushman and Smith, 2001; Biddle et al., 2009). Furthermore, it is worth noting that auditing serves the purpose of providing insurance and oversight, as highlighted by Chen et al. (2011). According to Bushman and Smith (2001), a high level of auditing quality has the effect of constraining managerial behaviour, enhancing the effectiveness of corporate resource allocation, and deterring unproductive investment. According to Copley and Douthett (2002), the implementation of high-quality auditing practices serves as a mechanism to prevent enterprises from making inadequate investments and effectively addresses investment-related challenges. According to studies by Chen et al. (2011) and Khurana and Raman (2004), the characteristics of equity influence the relationship between auditing quality and investment efficiency. Therefore, we put forth the subsequent hypothesis.

H2: High auditing quality can improve the investment efficiency of firms.

3. Data and Methodology

3.1. Data

Secondary data was collected for this study concerning 45 listed firms on the Ghana stock exchange market spanning from 2013 to 2022, and this makes the sample size for this study 450. The data source is the Ghana stock exchange market, and the choice of firms was based on their performance on the stock market and the period selected purposefully based on the data availability.

3.2. Methodology

The method of analysis adopted for this study are the summary statistics (percentage, mean and standard deviation), panel regression model and correlation analysis.

In the context of panel data analysis, researchers frequently encounter the difficulty of determining the most appropriate estimator for their model. Is the effect being referred to a fixed effect or a random effect? The generalized model for panel data can be expressed as follow.

$Y_{it} = a_i + BX_{it} + U_{it}$……. (1)

The underlying premise is that there is no correlation between AI and the explanatory factors that make up the null hypothesis. In other words, the alternative hypothesis that notation (ai) is correlated with the independent variable and frequently presents a challenge for the researcher in terms of the model or estimator to utilise is refuted by the fact that ai is independent of the explanatory variable in the model.

Hausman Test

Following the application of panel unit root tests to the series utilised in the study, the Hausman test was employed to determine the appropriate model, either the fixed effects model or the random effects model, during the model building phase.

The hypothesis is therefore stated as;

H0: Individual effects are random,

H1: Individual effects are constant

From the context of this study the panel regression can be specified as follows.

$INV_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 Big5_{it} + \beta_3 BS_{it} + \beta_4 BI_{it} + \beta_5 ROA_{it} + \beta_6 FS_{it} + \beta_7 LVG_{it} + U_{it...}$ (2)

DOI: 10.5281/zenodo.10208900

Where INV is the dependent variable, ESG is the independent variable while the Big5, BS, BI, ROA, FS and LVG are the control variables. The $U_{it.}$ is the random error term while ith unit represent the firms and the t is the period.

Meanwhile, the correlation analysis measures the direction and the strength of association between two variables. The coefficient of correlation is represented with r which lies between -1 and +1 respectively.

Table 1: Variable description

Variables	Symbol	Description
Investment Efficiency	INV	Percentage of the investment efficiency of the listed firm
ESG Performance	ESG	ESG Performance score of the listed firm in percentage
Auditing quality	Big5	Big5 equal 1 if a firm chooses top 5 global accounting firms for auditing and 0 otherwise
Board size	BS	The size of the board of directors of the listed firm
Board of Independence director	BI	Percentage of independence board of directors of the listed firm
Return on asset	ROA	This is the profit level calculated as the ratio of net profit to total assets
Firm size	FS	Natural logarithm of total assets of the listed firm
Financial leverage	LVG	The ratio of the total liabilities to asset

Source: Author's computation

4. Results and discussion

4.1. Results

Table 2: Summary statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Investment	450	0	87.67	35.03	21.88
ESG	450	2.89758	85.97	42.58	18.46
Board size	450	1	16	9.66	2.48
BI	450	0	100	50.73	17.39
ROA	450	-35.23	75.32	6.64	9.94
Firm size	450	13.24	19.001	16.55	1.05
LVG	449	0	0.7588	0.2786	0.17
	Auditing quality				
			Frequency	Percent	
	Valid	Otherwise	278	61.8	
			172	38.2	

Source: Author's computation using STATA software

Table 2 presents the findings related to the average investment efficiency, ESG performance, size of the board of directors, and the presence of independent directors in the listed firms of the Ghana stock market exchange under examination. The average investment efficiency is approximately 35%, with a variability of approximately 22%. Similarly, the average ESG performance is approximately 43%, with a variability of approximately 18%. The average size of the board of directors is approximately 10, with a variability of approximately 2. Furthermore, the average number of independent directors on the board is approximately 51, with a variance of approximately 17.

More so, Table 2 also reveals that the average return on assets for all the listed firms under review is about 7 with a variability of about 10, the average firm size is about 17 with a variability of about 1, and the average variability of financial leverage is about 0.3 with a variability of about 0.2. Additionally, there are 172 listed companies that underwent audits by the top 5 global auditing firms, representing 38.2% of the total, while there are 278 listed companies that did not undergo audits by the top 5 auditing firms, representing 61.8% of the total. This can be attributed to the high cost of hiring the services of the top 5 auditing firms.

4.2. Hausman test

The Hausman test was carried out, and the P = 0.1167 (see appendix), which exceeds the 0.05 significant level, suggests that a random effect model should be specified for the analysis of this study. The importance of Hausman is to eliminate the question of which estimator to apply for the analysis of the panel data.

Table 3: Random effect model

Investment Efficiency	B	Std. Error	Test Statistic	Pvalue	VIF
(Constant)	-47.094	9.823	-4.794	.000	
ESG	.980	.034	29.132	.000	1.241
Auditing quality	.545	1.154	.472	.037	1.013
Board size	.727	.243	2.995	.003	1.160
BI	-.012	.037	-.317	.751	1.341
ROA	.046	.060	.764	.445	1.143
Firm size	1.909	.580	3.294	.001	1.194
LVG	6.645	3.496	1.901	.058	1.097
Overall model P-value = 0.00 R-sq = 0.71					

Source: Author's computation using STATA software

Table 3 displays that the coefficient estimate of the ESG performance of the listed firms is statistically significant, which means that we can reject the null hypothesis at the 1% level. This means that ESG performance has a significant positive effect on investment efficiency, meaning that the higher ESG performance of the listed firms on the Ghana stock exchange market leads to

DOI: 10.5281/zenodo.10208900

higher investment efficiency. This supported the first hypothesis (H1) developed in the literature review. Also, the auditing quality coefficient is statistically significant, which means we have enough proof to reject the null hypothesis at 5%. This means that auditing quality has a positive and significant effect on investment policy, showing that high auditing quality makes firms' investments more efficient. This supports the second hypothesis (H2) and also Wang et al.'s work from 2022. Additionally, board size and firm size have a significant positive impact on the investment efficiency of the firms, which suggests that high board size and firm size contribute to the high investment efficiency of the firms.

The R-squared value of 0.71 indicates that 71% of the variation in investment efficiency can be attributed to the ESG performance and the control variables. The overall model P = 0.00 indicates that the random effect model is statistically significant, indicating that there is a significant relationship between investment efficiency and ESG performance while adjusting for auditing quality, board size of directors, board of independence directors, return on assets, firm size and financial leverage. This indicates that the model is a good fit for the data, as the R-squared is relatively high and the overall model is statistically significant.

Table 4: Correlation analysis

	Investment	ESG	Auditing quality	Board size	BI	ROA	Fsize	LVG
Investment	1							
ESG	.831	1						
Auditing quality	0.071	0.074	1					
Board size	.100	0.003	-0.063	1				
BI	.260	.373	0.003	-.307	1			
ROA	.126	.162	0.037	0.056	0.066	1		
Firm size	0.085	-0.031	0.000	.141	-.105	-.301	1	
LVG	.140	0.078	-0.003	0.040	-.118*	-0.087	.247	1

Source: Author's computation using STATA software

Table 4 shows that there is a very strong positive correlation between the investment efficiency and the ESG performance score of the firms, indicating that high ESG performance contributes to the high investment efficiency of the firms. In the same vein, investment efficiency demonstrates a weak positive correlation with auditing quality, board size of directors, board of independence directors, return on assets, firm size and financial leverage.

Table 5: Diagnostic test (Normality test with Shapiro Wilk)

Variables	Observation	Prob>Z
Investment	450	0.86939
ESG	450	0.86923
Board size	450	0.19376
BI	450	0.86651
ROA	450	0.69944

Source: Author's computation using STATA software

Table 5 shows that the P-value of the response variable and the independent variable alongside the control variables is greater than 0.05, which means that the data are normally distributed and satisfy the normality assumption. Besides, the variance inflation factor (VIF) for all the independent variables in Table 3 is less than 5, indicating that the fitted random effect model does not suffer from the problem of multicollinearity.

4.3. Discussion of findings

According to the data presented in Table 2, the mean investment efficiency is approximately 35%, with a standard deviation of approximately 22%. Similarly, the average ESG performance is approximately 43%, with a standard deviation of approximately 18%. The mean size of the board of directors for the listed firms on the Ghana stock exchange being examined is approximately 10, with a standard deviation of approximately 2. Additionally, the average number of independent directors on the board is approximately 51, with a standard deviation of approximately 17. Furthermore, according to Table 2, it can be observed that the mean return on assets for the examined firms is approximately 7, with a standard deviation of approximately 10. The mean firm size is approximately 17, with a standard deviation of approximately 1. Additionally, the mean financial leverage variability is approximately 0.3, with a standard deviation of approximately 0.2. Additionally, the top five global auditing firms conducted audits on a total of 172 listed companies, accounting for 38.2% of the overall figure. In contrast, the top five auditing firms did not conduct audits on 278 listed companies, which accounts for 61.8% of the total. The elevated expenses associated with engaging the services of the leading five auditing firms can be attributed to this phenomenon.

The Hausman test was conducted, yielding a p-value of 0.1167 (refer to the appendix). This p-value, which surpasses the significance level of 0.05, indicates that it is appropriate to employ a random effect model for the analysis of this study. The significance of Hausman lies in its ability to resolve the issue of selecting an appropriate estimator for panel data analysis.

Table 3 presents the coefficient estimate pertaining to the ESG performance of the listed firms, demonstrating statistical significance. This implies that, at a significance level of 1%, we are able to reject the null hypothesis. This implies that the performance of environmental, social, and governance (ESG) factors has a

DOI: 10.5281/zenodo.10208900

notable and favourable impact on investment efficiency. Specifically, it suggests that the superior ESG performance exhibited by firms listed on the Ghana stock exchange market results in heightened levels of investment efficiency. The findings of this study provide support for the initial hypothesis (H1) formulated in the literature review. Additionally, the statistical significance of the auditing quality coefficient indicates that there is sufficient evidence to reject the null hypothesis at a significance level of 5%. This finding suggests that the quality of auditing has a notable and favourable impact on investment policy, indicating that enterprises with higher auditing quality have enhanced efficiency in their investments. This finding provides support for the second hypothesis (H2) as well as corroborates the findings of Wang et al. (2022). Moreover, there is a notable positive correlation between board size and company size and the investment efficiency of enterprises. This implies that larger board sizes and firm sizes are associated with higher levels of investment efficiency in firms.

It looks like the R-squared coefficient, which is 0.71, can explain about 71% of the changes seen in how well investments work. This is because the ESG performance and the control factors work together. The model's overall p-value of 0.00 suggests that the random effect model is statistically significant. This indicates that there is a significant association between investment efficiency and ESG performance, even after accounting for factors such as auditing quality, board size, board independence, return on assets, firm size, and financial leverage. The relatively high R-squared value and the statistical significance of the entire model support this observation that the model exhibits a strong correspondence with the data.

Moreover, the findings presented in Table 4 demonstrate a robust and significant positive relationship between investment efficiency and the firms' ESG performance score. This suggests that firms with higher ESG performance tend to exhibit greater investment efficiency. Similarly, there exists a modest positive association between investment efficiency and factors such as auditing quality, board size of directors, board independence, return on assets, business size, and financial leverage.

5. Conclusion

The use of environmental, social, and governance (ESG) data holds the potential to cultivate stakeholder confidence, reduce transaction costs, and improve investment efficiency. This study centers its attention on the examination of ESG performance, auditing quality, and investment efficiency within the specific context of Ghana. The present study investigates a representative sample of publicly listed companies in the country of Ghana, spanning the time period from 2013 to 2022. The Hausman test was performed in order to ascertain the most suitable model for the study, and the random effect model was chosen as the estimator.

The results obtained from the application of the random effect model demonstrate a statistically significant and positive correlation between ESG performance, auditing quality, and investment efficiency in the specific setting of publicly traded companies in Ghana. Therefore, this study provides a significant contribution to the existing corpus of literature about environmental, social, and governance (ESG) performance. Moreover, it provides pertinent resources for the adoption of environmental, social, and governance (ESG) practices and the advancement of sustainable business expansion in many developing economies.

Appendix

```
. hausman fixed random

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |    fixed         random       Difference          Std. err.
-------------+------------------------------------------------------------
         ESG |   1.115903     1.095418         .020485        .0119475
Auditingqu~y |  -.1608489    -.0861009        -.0747481               .
  Boardsize |   .1350675      .229051        -.0939835        .1175743
         BI |  -.0210776    -.0276468         .0065691        .0133988
   BGenderD |   .0961642     .0877558         .0084085        .0099876
        ROA |  -.0039504     -.012648         .0086975        .0231319
      Fsize |  -.3293206     .5867502        -.9160709        .5710934
------------------------------------------------------------------------------
                b = Consistent under H0 and Ha; obtained from xtreg.
 B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Difference in coefficients not systematic

    chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
            =  11.54
Prob > chi2 = 0.1167
(V_b-V_B is not positive definite)
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