The Effect of Board of Directors Diversity on ESG (Environmental, Social, Governance) Firm Performance: Evidence from Egypt

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Abstract

This paper investigates the relationship between board of directors' diversity and Environmental, Social, and Governance (ESG) firm performance within the context of Egypt. With an increasing emphasis on corporate responsibility and sustainable practices, understanding how board diversity influences ESG performance is key for firms seeking to enhance their long-term sustainability and value creation. Utilizing a comprehensive dataset compiled from Egyptian firms, this research employs multiple regression analysis to explore the impact of board diversity, including gender, educational background, and cultural diversity, on ESG performance metrics. This study aims to provide a nuanced understanding of the dynamics between board diversity and ESG outcomes in the Egyptian corporate landscape.

Firstly, the outcomes of this research on the firm performance is that (1) the researcher will accept the first hypothesis which means that there is significant impact from board of directors' characteristics diversity on firms' performance (ROA), (2) the researcher will accept the second hypothesis which means that there is significant impact from board of directors' characteristics diversity on firms' performance (ROE), lastly (3) the researcher will reject the third hypothesis which means that there is no significant impact from board of directors' characteristics diversity on firms' performance (EPS). Secondly, the outcomes of this research on the firm performance moderated by ESG firms' performance is that (1) the researcher will accept the fourth hypothesis which means that there is significant impact from board of directors' characteristics diversity on firms' performance (ROA) moderated by ESG firms' performance, (2) the researcher will accept the fifth hypothesis which means that there is significant impact from board of directors' characteristics diversity on firms' performance (ROE) moderated by ESG firms' performance, finally (3) the researcher will reject the sixth hypothesis which means that there is no significant impact from board of directors' characteristics diversity on firms' performance (EPS) moderated by ESG firms' performance.

Keywords: BOD, ESG, and firm performance.

تأثير تنوع أعضاء مجلس الإدارة على أداء الشركة البيئي والاجتماعي والحوكمة: أدلة من مصر

ملخص عربي :

تبحث هذه الورقة في العلاقة بين تنوع مجلس الإدارة وأداء الشركات البيئي والاجتماعي والحوكمة (ESG) في سياق مصر. ومع التركيز المتزايد على مسؤولية الشركات والممارسات المستدامة، فإن فهم كيفية تأثير تنوع مجلس الإدارة على الأداء البيئي والاجتماعي والحوكمة (ESG) يعد أمرًا أساسيًا للشركات التي تسعى إلى تعزيز استدامتها على المدى الطويل وخلق القيمة. باستخدام مجموعة بيانات شاملة تم جمعها من الشركات المصرية، يستخدم هذا البحث تحليل الانحدار المتعدد لاستكشاف تأثير تنوع مجالس الإدارة، بما في ذلك الجنس والخلفية التعليمية والتنوع الثقافي، على مقاييس الأداء البيئية والاجتماعية والحوكمة. تهدف هذه الدراسة إلى توفير فهم دقيق للديناميكيات بين تنوع مجالس الإدارة ونتائج الحوكمة البيئية والاجتماعية والحوكمة في مشهد الشركات المصرية. أولا، نتائج هذا البحث على أداء الشركة هي (١) يقبل الباحث الفرضية الأولى التي تعني أن هناك تأثير كبير لتنوع خصائص مجلس الإدارة على أداء الشركات (٢)(ROA) الباحث سيقبل الفرضية الثانية التي تعني أن هناك تأثيراً معنوياً لتنوع خصائص مجلس الإدارة على أداء الشركات (ROE)، وأخيراً (٣) سيرفض الباحث الفرضية الثالثة التي تعني أنه لا يوجد تأثير كبير من تنوع خصائص مجلس الإدارة خصائص التنوع على أداء الشركات (EPS). ثانياً، نتائج هذا البحث حول أداء الشركات التي يديرها أداء الشركات البيئية والاجتماعية والحوكمة هي (١) سيقبل الباحث الفرضية الرابعة مما يعني أن هناك تأثير كبير من تنوع خصائص مجلس الإدارة على أداء الشركات (ROA). الخاضعة لأداء الشركات البيئية والاجتماعية والحوكمة، (٢) سيقبل الباحث الفرضية الخامسة مما يعني أن هناك تأثير كبير من تنوع خصائص مجلس الإدارة على أداء الشركات (ROE) الخاضعة لأداء الشركات البيئية والاجتماعية والحوكمة، وأخيرا (٣) سوف يرفض الباحث الفرضية السادسة التي تعني أنه لا يوجد تأثير كبير لتنوع خصائص مجلس الإدارة على أداء الشركات (EPS) الذي يديره أداء الشركات البيئية والاجتماعية والحوكمة (ESG).

الكلمات المفتاحية: مجلس الإدارة، الحوكمة البيئية والاجتماعية والحوكمة، أداء الشركة.

1. Introduction

The discussion surrounding board diversity has evolved significantly in recent years, with a growing body of research highlighting its importance across various dimensions such as gender, education, culture, and size. Scholars argue that diverse boards serve as catalysts for creativity, innovation, and opportunity identification within organizations (Şener & Karaye, 2014).

Diversity also increases the quality of decisions made at individual and group levels (Erhardt , Werbel, & Shrader , 2003). The existence of female directors creates a beneficial and more meticulous decision-making process for companies because females generally expend more effort on their tasks as compared to males (Manita, Bruna, Dang, & Houanti, 2018).

The growing interest in BOD structure and firm performance has created a wide field of research, where some specific theories have been established from several perspectives such as economics, laws, organizational behavior, ethics, and psychology (Carter, Souza, Simkins, & Simpson, 2010).Therefore, BOD diversity is a significant element in improving the corporate governance system and strategic decisions in the boardroom (Manita, Bruna, Dang, & Houanti, 2018). There has been ongoing interest and research within the corporate governance literature, examining the impact of board gender diversity on corporate financial performance (Issa A. , Hanaysha, Elfeky, & Ullah, 2019). Accordingly, the main aim of the present study is

to investigate the relationship between BOD Diversity, ESG Performance, & Firm performance.

2. The relationship between the board of directors' diversity, and ESG firm performance

After decades of extensive research, there is no consensus on why companies engage in corporate, social, and environmental governance practices. As previous research clearly shows that sustainability considerations affect stock prices and firm value. However, experimental studies have produced mixed results (Hjálmsdóttir & Bjarnadóttir, 2020). Consistent with the objectives of this thesis, the literature review focuses on the relationship between ESG practices and corporate debt financing costs.

The paper investigates the relationship between gender diversity in the boardroom and the cost of debt, perception of default, and debt relief costs. There is a positive relationship, and in this study, the performance of Jordanian industrial and service companies listed on the Amman Stock Exchange (ASE) from 2015 to 2019 is compared with the characteristics of the board of directors. Research results indicate that research variables have a positive effect on performance, however, company age and education level have a negative impact. However, (Khidmat, Ayub Khan, & Ullah, 2012) existing empirical literature on the relationship between board diversity and firm performance has yielded mixed results.

3. The relationship between the board of directors' Gender diversity ESG firm performance

The study will look to Gender diversity as the main, the researcher chose this as the main diversity because recent research highlights the role of gender diversity in corporate performance (Campbell & Vera, 2008).

The gender diversity of leadership team members is a topic of interest in several studies in management and organizational theory. For example, researchers link gender diversity with promotion in management (Siri , Ruth, & Singh, 2009), management style and career achievement, occupational pressures, and personal networks (Darmadi, 2013).

4. The relationship between the board of directors' education diversity and ESG firm performance

This paper contributes to the literature using board educational background diversity to capture the different cultural perspectives and value systems directors bring to the team provides a more complete picture than using board nationality diversity alone. Because the country of origin of directors is often undisclosed, a foreign born and foreign-educated director who later became a US citizen would be classified as a domestic director by nationality/citizenship. Including education background to measure board diversity mitigates this data limitation.

5. The relationship between the board of directors' Culture Diversity and ESG firm performance

In recent times, corporate environmental, social and governance (ESG) practices have received considerable attention in academia and business community (Eliwa, Y., Aboud, A., & Saleh, A., 2021). Firms are being pressurized to improve operational efficiency and financial performance while facing significant demand from numerous groups of stakeholders to go beyond the mandated level of ESG activities (Eliwa, Y., Aboud, A., & Saleh, A., 2021).

6. Research Question:

The research question is followed by the research problem; is there Is there an effect between Board of Directors (BOD) Diversity and Environmental, Social, and Governance (ESG) Firm Performance?

7. Research Objectives:

- **Explain Board of Directors Diversity:**

- Define and characterize board diversity, encompassing variables such as gender, education, culture, and size.
- Explore the importance of board diversity in enhancing decision-making processes and strategic governance.

- **Explain Firm Performance:**

- Define firm performance metrics, including Return on Assets (ROA), Return on Equity (ROE), and Earnings per Share (EPS).
- Discuss the significance of these performance indicators in assessing the financial health and sustainability of firms.

- **Explain the Moderator Environmental, Social, and Governance (ESG):**

- Define ESG (Environmental, Social, and Governance) criteria and their relevance to corporate sustainability and responsibility.
- Highlight the role of ESG factors in shaping firms' reputations, risk management practices, and long-term value creation.

- **Examine the Relation between Board of Directors Diversity and Firm Performance:**

- Investigate the impact of board diversity, including gender, education, culture, and size diversity, on firm performance metrics (ROA, ROE, EPS).
- Analyze how variations in board diversity influence ESG performance outcomes and overall corporate governance effectiveness.
- Explore potential moderating effects of ESG criteria on the relationship between board diversity and firm performance.

8. Research Hypothesis

When considering the effects of diversity in board composition, several kinds of diversity must be considered (Huse & A. G., 2006): do some kinds of diversity have a more significant effect than other kinds of diversity? In this way, the researcher tests the impact of board diversity on innovation by investigating gender diversity Therefore, we can formulate the hypothesis:

- $\boldsymbol{H_1}$: There is a significant impact of the board of directors' characteristics diversity on firms' performance (ROA).
- $\boldsymbol{H_2}$: There is a significant impact of the board of directors' characteristics diversity on firms' performance (ROE).
- $\boldsymbol{H_3}$: There is a significant impact of board of directors' characteristics diversity on firms' performance (EPS).
- $\boldsymbol{H_4}$: There is a significant impact of the board of directors' characteristics diversity on firms' performance (ROA) moderated by ESG firms' performance.
- $\boldsymbol{H_5}$: There is a significant impact of board of directors' characteristics diversity on firms' performance (ROE) moderated by ESG firms' performance.
- $\boldsymbol{H_6}$: There is a significant impact of the board of directors' characteristics diversity on firms' performance (EPS) moderated by ESG firms' performance.

9. Research Methodology

This part is aimed at describing the thesis's methodology, contains a detailed description of the research methodology and describes the research design used in it. It discusses, sample selection, variables, research model, hypothesis and linear panel model.

10.Data collection

The researcher collected annual data for 6 years from 45 companies listed under $\boldsymbol{EGX_{100}}$, thus the final sample size is 45 companies each one has an annual time series of 6 years from year 2017 till 2022, so the total final number of the applied study sample is 270 observations.

10.1 Descriptive Analysis

The main study variables will be analyzed to determine measures of central tendency which are: mean, maximum and minimum values, and their measures of dispersion presented in standard deviation and coefficient of variation for each variable.

Table 10-1 Variables descriptive analysis

Variable	N	Minimum	Maximum	Mean	Standard Deviation	Coefficient of Variation
Gender diversity	270	0.00	0.50	0.14	0.12	0.87
Education diversity	270	0.00	0.70	0.25	0.18	0.71
Culture diversity	270	2.00	4.00	3.45	0.39	0.11
ROA	270	-0.33	0.86	0.08	0.11	1.44
ROE	270	-1.00	13.61	0.28	1.24	4.48
EPS	270	4.63	15.00	0.81	1.86	2.30
Firm size	270	14.15	25.82	21.35	1.98	0.09
Leverage	270	0.00	4.05	0.47	0.34	0.72

Source: prepared by the researcher from E-views software output.

From table (3.1) it is concluded that:

- All study variables have 270 observations which mean that there is no missing data.
- The independent sub-variable Gender diversity has a minimum value of 0.00 and maximum value of 0.50 with an arithmetic mean of 0.14, and its standard deviation is 0.12 and coefficient of variation of 87% which indicates a moderate level of dispersion of values around the arithmetic mean.
- The independent sub-variable Education diversity has a minimum value of 0.00 and maximum value of 0.70 with an arithmetic mean of 0.25, and its standard deviation is 0.18 and coefficient of variation of 71% which indicates a moderate level of dispersion of values around the arithmetic mean.
- The independent sub-variable Culture diversity has a minimum value of 2.00 and maximum value of 4.00 with an arithmetic mean of 3.45, and its standard deviation is 0.39 and coefficient of variation of 11% which indicates a low level of dispersion of values around the arithmetic mean.
- The dependent variable Return on Assets (ROA) has a minimum value of -0.33 and maximum value of 0.86 with an arithmetic mean of 0.08, and its standard deviation is 0.11 and coefficient of variation of 144% which indicates a high level of dispersion of values around the arithmetic mean.
- The dependent variable Return on Equity (ROE) has a minimum value of -1.00 and maximum value of 13.61 with

an arithmetic mean of 0.28, and its standard deviation is 1.24 and coefficient of variation of 448% which indicates a high level of dispersion of values around the arithmetic mean.

- The dependent variable Earnings per Share (EPS) has a minimum value of 4.63 and maximum value of 15.00 with an arithmetic mean of 0.81, and its standard deviation is 1.86 and coefficient of variation of 230% which indicates a high level of dispersion of values around the arithmetic mean.
- The control variable Firm size has a minimum value of 14.15 and maximum value of 25.82 with an arithmetic mean of 21.35, and its standard deviation is 1.98 and coefficient of variation of 9% which indicates a low level of dispersion of values around the arithmetic mean.
- The control variable Leverage has a minimum value of 0.00 and maximum value of 4.05 with an arithmetic mean of 0.47, and its standard deviation is 0.34 and coefficient of variation of 72% which indicates a moderate level of dispersion of values around the arithmetic mean.
- The dispersion values range from low to high levels of dispersion according to coefficient of variation measurement due to the sample diversification, as the sample consists of different companies from different sectors with different natures under $\boldsymbol{EGX_{90}}$, to make the sample present the whole index ant not being biased.

- The researcher used frequency distribution to perform a descriptive analysis to the moderator variable ESG firms' performance as the following table:

Table 10-2 ESG firms' performance descriptive analysis

ESG firms' performance	Frequency	Percentage
Zero	191	70.7%
one	79	29.3%
Total	**270**	**100%**

Source: prepared by the researcher from E-views software output.

From table (3.2) it is concluded that the dummy moderator variable ESG firms' performance has 191 observations with value of (zero) presenting 70.7% from total sample, while it has 79 observations with value of (one) presenting 29.3% from total sample.

10.2 Test of normality

The researcher applied Shapiro-Wilk test to determine whether the main variables of study follow the normal distribution or not, Shapiro-Wilk test is a Chi-squared test of normality which its null hypothesis states that variables are not normally distributed if the test *p-value* is less than or equal 0.05, while its alternative hypothesis states that variables are normally distributed if the test *p-value* is more than 0.05.

Table 10-3 Shapiro-Wilk test of normality

Variable	Statistic	*df*	*P-value*
Gender diversity	0.914	270	*0.000*
Education diversity	0.934	270	*0.000*
Culture diversity	0.903	270	*0.000*
ESG Performance	0.911	270	*0.000*
ROA	0.843	270	*0.000*
ROE	0.207	270	*0.000*
EPS	0.539	270	*0.000*
Firm size	0.905	270	*0.000*
Leverage	0.741	270	*0.000*

Source: prepared by the researcher from E-views software output.

From table (3.3) it is concluded that all the independent sub-variables, the moderator variable, and dependent sub-variables are not normally distributed as their *p-value* of Chi-square statistic is less than 0.05, so the alternative hypothesis will be accepted that the variables are not follow the normal distribution.

10.3 Testing the means differences between the independent sub-variables

In order to test that is there a significant difference between the independent variable "Board characteristics diversity" sub-variables and the dependent variable "Firms' performance" sub-variables means are equal or not, the researcher will use Kruskial-Wallis test to test the mean differences between three or more sub-variables, by which the test null hypothesis states that: there is no significance difference between sub-variables means and will be accepted if the test *p-value* more than or equal 0.05,

while the test alternative hypothesis states that: there is a significance difference between sub-variables means and will be accepted if the test *p-value* less than 0.05.

The following table (3.4) presents Kruskial-Wallis test to test the means difference of independent variable "Board characteristics diversification" sub-variables which are: (Gender diversity, Education diversity, and Culture diversity).

Table 10-4 Kruskial-Wallis test of Board characteristics diversity

Method	DF	Chi-Squared	*P-value*	Reject H_0 at (α=0.05)
Not Corrected for Ties	2	549.7593	*0.000*	**Yes**
Corrected for Ties	2	551.5086	*0.000*	**Yes**

Source: prepared by the researcher from SPSS output

From table (3.4) it is concluded that: there is a significance difference between Board characteristics diversity sub-variables means which are: (Gender diversity, Education diversity, and Culture diversity.

The following table (3.5) presents Kruskial-Wallis test to test the means difference dependent variable "Firms' Performance" sub-variables which are: (Return on Assets, Return on Equity, and Earnings per share).

Table 10-5 Kruskial-Wallis test of Firms' Performance

Method	DF	Chi-Squared	*P-value*	Reject H_0 at (α=0.05)
Not Corrected for Ties	2	160.9796	*0.000*	**Yes**
Corrected for Ties	2	160.9800	*0.000*	**Yes**

Source: prepared by the researcher from SPSS output

From table (3.5) it is concluded that: there is a significant difference between Firms' Performance sub-variables means which are: (Return on Assets, Return on Equity, and Earnings per share).

10.4 Correlation Matrix

After applying test of normality for the independent sub-variables, moderator and the dependent sub-variables of study and its found that the study variables don't follow the normal distribution, So Spearman correlation coefficient will be the most appropriate coefficient for determining the relation strength and direction between each two variables, then the correlation coefficient is tested by a t-test which its null hypothesis states that correlation does not exist if the test *p-value* is greater than 0.05.

Table 10-6 Spearman correlation matrix

Variable	BGD	Culture	Education	Firm size	Leverage	ESG	ROA	ROE	EPS
BGD	**1.000**								
P-value	-								
Culture	-0.170**	**1.000**							
P-value	*0.005*	-							
Education	-0.109	0.083	**1.000**						
P-value	*0.073*	*0.171*	-						
Firm size	-0.079	-0.019	0.112	**1.000**					
P-value	*0.197*	*0.753*	*0.067*	-					
Leverage	-0.050	0.234**	-0.186**	0.167**	**1.000**				
P-value	*0.417*	*0.000*	*0.002*	*0.006*	-				

ESG	0.022	-0.077	0.011	0.101	0.084	**1.000**			
P-value	*0.718*	*0.208*	*0.856*	*0.099*	*0.170*	-			
ROA	0.236*	-0.321**	0.211*	0.273*	-0.283**	0.286**	**1.000**		
P-value	*0.048*	*0.000*	*0.048*	*0.031*	*0.000*	*0.006*	-		
ROE	-0.025	-0.335**	-0.015	0.166**	-0.052	0.442**	0.861**	**1.000**	
P-value	*0.686*	*0.000*	*0.800*	*0.006*	*0.399*	*0.006*	*0.000*	-	
EPS	-0.013	-0.152*	0.054	0.165**	-0.158**	0.250	0.662**	0.608**	**1.000**
P-value	*0.827*	*0.013*	*0.378*	*0.007*	*0.010*	*0.007***	*0.000*	*0.000*	-

Source: prepared by the researcher from E-views software output.

From Matrix (3.6) it is concluded that:

- There is a significant, direct and weak relation between Return on assets (ROA) and Board gender diversity with correlation coefficient value of 0.236 and *P-value* 0.048.
- There is a significant, inverse and weak relation between Return on assets (ROA) and Culture diversity with correlation coefficient value of -0.321 and *P-value* 0.000.
- There is a significant, direct and weak relation between Return on assets (ROA) and Education diversity with correlation coefficient value of 0.211 and *P-value* 0.048.
- There is a significant, direct and weak relation between Return on assets (ROA) and Firm size with correlation coefficient value of 0.273 and *P-value* 0.031.
- There is a significant, inverse and weak relation between Return on assets (ROA) and Leverage with correlation coefficient value of -0.283 and *P-value* 0.000.

- There is a significant, direct and weak relation between Return on assets (ROA) and ESG performance with correlation coefficient value of 0.286 and *P-value* 0.000.
- There is an insignificant, inverse and weak relation between Return on Equity (ROE) and Board gender diversity with correlation coefficient value of -0.025 and *P-value* 0.686.
- There is a significant, inverse and weak relation between Return on Equity (ROE) and Culture diversity with correlation coefficient value of -0.335 and *P-value* 0.000.
- There is an insignificant, inverse and weak relation between Return on Equity (ROE) and Education diversity with correlation coefficient value of -0.015 and *P-value* 0.800.
- There is a significant, direct and weak relation between Return on Equity (ROE) and Firm size with correlation coefficient value of 0.166 and *P-value* 0.006.
- There is an insignificant, inverse and weak relation between Return on Equity (ROE) and Leverage with correlation coefficient value of -0.052 and *P-value* 0.399.
- There is a significant, direct and weak relation between Return on Equity (ROE) and ESG performance with correlation coefficient value of 0.442 and *P-value* 0.006.
- There is an insignificant, inverse and weak relation between Earnings per share (EPS) and Board gender diversity with correlation coefficient value of -0.013 and *P-value* 0.827.

- There is a significant, inverse and weak relation between Earnings per share (EPS) and Culture diversity with correlation coefficient value of -0.152 and *P-value* 0.013.
- There is an insignificant, direct and weak relation between Earnings per share (EPS) and Education diversity with correlation coefficient value of 0.054 and *P-value* 0.378.
- There is a significant, direct and weak relation between Earnings per share (EPS) and Firm size with correlation coefficient value of 0.165 and *P-value* 0.031.
- There is a significant, inverse and weak relation between Earnings per share (EPS) and Leverage with correlation coefficient value of -0.158 and *P-value* 0.010.
- There is a significant, direct and weak relation between Earnings per share (EPS) and ESG performance with correlation coefficient value of 0.250 and *P-value* 0.007.

10.5 Linear Panel Regression model specification

10.5.1 The Panel Regression Model:

The study hypotheses postulate the board characteristics and ownership structure on financial distress moderated by firm size. Typically, data set has a cross-sectional observation among different companies and re-sampled at a certain period, so a Panel data regression will be most applicable to represent such a linear relationship and the following is the model equation:

$$\hat{y}_{it} = \beta\hat{o} + \beta\hat{1}x_{it} + \cdots + \beta\hat{n}x_{it} + \epsilon_{it}$$

Where:

- $\beta o\hat{}$: The estimated constant term.
- $\beta n\hat{}$: The estimated independent Parameter coefficient.
- y: The dependent variable.
- x: The independent variable.
- i: The Firm Number.
- t: Referring to the year.
- $\in$: Model white noise error.

10.6 Steps of Constructing a Panel Regression Model:

- Set the time series variable and the cross-section variable to identify the panel regression model.
- Run a pooled Panel Regression and show the model significance result.
- Apply F-test to determine which more significant pooled or fixed model is.
- Apply Breusch-Pagan test to determine which is more significant Pooled or Random model is.
- Apply Hausman test to determine which is more significant Fixed or Random model is.

"In the three tests: F-test, Breusch-Pagan test, and Hausman test if the *p-value* < 0.05, accept the alternative hypothesis".

- Apply Robustness check test by performing:

a) **F-test for joint regressors' significance:** the regressors' are jointly significant with the panel model if the *p-value* of F-test is less than 0.05.

b) **Welch test for intercepts of different groups** (cross sections or time): The groups will have a common intercept if Welch test has *p-value* more than 0.05, while the groups will have a different intercept if Welch test has *p-value* less than 0.05

Pooled OLS: The simplest estimator for panel data is pooled OLS. In most cases this is unlikely to be adequate, but it provides a baseline for comparison with more complex estimators.

Fixed Effects are constant across firms', and **random effects** vary according time. a model with random intercepts $\boldsymbol{ai}$ and fixed slope $\boldsymbol{b}$ corresponds to parallel lines for different individuals, or the model $y_{it} = a_i + b_t y_{it} = a_i + b_t$. Kreft and De Leeuw (1998) thus distinguish between fixed and random coefficients.

- Performing the model diagnostics tests:

a) **Ramsey RESET test for model specification:** This test is used to determine whether the model contains all the appropriate variables and excludes all irrelevant variables to ensure that the model estimated coefficients are not biased. This is done through the Ramsey RESET Test, and the decision criterion is to accept the null hypothesis that the study model includes all the appropriate variables *p-value* was greater than (0.05).

b) White Stability test for random error variation: The regression models and the OLS method are based on several

assumptions, including the constancy of homoscedasticity by which the mean should be equal to zero, and if the Heteroscedasticity variation is used, some methods are used to overcome this problem, such as the White test. The null hypothesis is that the model has a problem of random error instability if *p-value* is greater than 0.05.

c) Variance Inflation Factors: Minimum possible value equal 1.0 and the values greater than 10.0 may indicate a collinearity problem.

10.7 Testing the First Hypothesis

For testing the impact of board of directors' characteristics diversity on firms' performance (ROA), the researcher will apply the panel diagnostics tests to determine the most appropriate linear panel regression to test that hypothesis.

Table 10-7 The pooled panel model diagnostics for the first hypothesis H_1

Test	Purpose	Test-statistic result	*P-value*	Fitted panel model
F-test	Comparing between Pooled panel and Fixed Effect Panel	F = 4.25994	4.02129e-013	Fixed effect
Breusch-Pagan test	Comparing between Pooled panel and Random Effect Panel	LM = 76.1452	2.63559e-018	Random effect
Hausman test	Comparing between Fixed Effect panel and Random Effect Panel	H = 4.47364	0.483418	Random effect

Source: Prepared by the researcher depending on E-views software output.

After comparing the three panel effects (pooled, fixed, and random) the researcher found that random linear panel regression is the most fitted model for forecasting Return on Assets (ROA).

Also, will apply and robustness check test to verify this model to be applied for any other sample from the study population.

Table 10-8 The robustness check test panel model diagnostics for the first hypothesis H_1

Test	Purpose	Test-statistic result	*P-value*	Fitted panel model
F-test for joint regressors' significance	The regressors' are jointly significant with the panel model	F = 10.632	<0.0001	Verified
Welch test for intercepts of different groups	Cross sections and time have a common intercept or one of them performed by different intercepts	F = 69.362	<0.0001	Cross sections or time have different intercepts

Source: Prepared by the researcher depending on E-views software output.

From the robustness check test, it was found that:

- The F-test for joint regressors' showed a significant impact of the dependent variable and constant on the dependent variable as its *p-value* is less than 0.05.
- Welch test for intercepts of different groups showed that Cross sections and time have different intercepts which verified that random panel model is the most appropriate linear regression model for this relation.

Table 10-9 The random effect panel model of the first hypothesis H_1

Model	*Random effect Panel*	**Dependent variable**		ROA	**VIF Test**
Independent variables	***Coefficient***	***t-ratio***	***p-value***	**Significance**	
Constant	0.135315	2.111	0.0357	**Significant**	
Gender diversity	−0.101432	−2.496	0.0132	**Significant**	1.045
Culture diversity	−0.0910354	−4.145	<0.0001	**Significant**	1.075
Education diversity	0.0415095	3.199	0.0015	**Significant**	1.069
Firm size	0.00850385	3.320	0.0010	**Significant**	1.061
Leverage	−0.121317	−5.786	<0.0001	**Significant**	1.065
F-test	16.52436	***p-value***		<0.0001	
Ramsey Reset test	0.44535	***p-value***		0.716265	
Heterosckadicity test	0.9982	***p-value***		0.852337	
Adjusted R-squared		22.3938%			

Source: Prepared by the researcher depending on E-views software output.

From table (3.9) it is concluded that:

- The overall random panel model is significant as the overall F-test for significance has a value of 16.52436 and *p-value* <0.0001 which is less than 0.05, with adjusted R-squared value of 22.3938% which means that the independent sub-variables explain the change in the Return on Assets (ROA) by 22.3938%.
- Constant has significant impact on ROA.
- Gender diversity has an inverse and significant impact on ROA.
- Culture diversity has an inverse and significant impact on ROA.
- Education diversity has direct and significant impact on ROA.
- Firm size has direct and significant impact on ROA.

- Leverage has an inverse and significant impact on ROA.
- There is no problem of Multi-collinearity between the independent variables as the VIF test showed result of one for the independent variable.
- Ramsey reset test has a *p-value* of 0.716265 which is greater than 0.05, which means that the independent variables in the models are sufficient.
- Both Heterosckadicity test has *p-values* of 0.852337, which means that the residuals have a constant variance on long run and the model doesn't suffer from Heterosckadicity problem.
- The overall equation for forecasting the ROA is:

$$\widehat{ROA_{it}} = 0.135315 - 0.101432\text{BGD}_{\text{it}} - 0.0910354\text{Culture}_{\text{it}} + 0.0415095\text{Education}_{\text{it}} + 0.00850385\ \text{Size}_{\text{it}} - 0.121317\ \text{Leverage}_{\text{it}}$$

Therefore, the researcher will accept the first hypothesis which means that there is significant impact from board of directors' characteristics diversity on firms' performance (ROA).

10.8 Testing the second Hypothesis

For testing the impact of board of directors' characteristics diversity on firms' performance (ROE), the researcher will apply the panel diagnostics tests to determine the most appropriate linear panel regression to test that hypothesis.

Table 10-10 The pooled panel model diagnostics for the second hypothesis H_2

Test	Purpose	Test-statistic result	*P-value*	Fitted panel model
F-test	Comparing between Pooled panel and Fixed Effect Panel	F = 8.59774	1.24047e-028	Fixed effect
Breusch-Pagan test	Comparing between Pooled panel and Random Effect Panel	LM = 204.01	2.78508e-046	Random effect
Hausman test	Comparing between Fixed Effect panel and Random Effect Panel	H = 2.47249	0.780632	Random effect

Source: Prepared by the researcher depending on E-views software output.

After comparing the three panel effects (pooled, fixed, and random) the researcher found that random linear panel regression is the most fitted model for forecasting Return on Equity (ROE).

Also, will apply and robustness check test to verify this model to be applied for any other sample from the study population.

Table 10-11 The robustness check test panel model diagnostics for the second hypothesis H_2

Test	Purpose	Test-statistic result	*P-value*	Fitted panel model
F-test for joint regressors' significance	The regressors' are jointly significant with the panel model	F = 10.485	<0.0001	Verified
Welch test for intercepts of different groups	Cross sections and time have a common intercept or one of them performed by different intercepts	F = 72.533	<0.0001	Cross sections or time have different intercepts

Source: Prepared by the researcher depending on E-views software output.

From the robustness check test it was found that:

- The F-test for joint regressors' showed a significant impact of the dependent variable and constant on the dependent variable as its *p-value* is less than 0.05.
- Welch test for intercepts of different groups showed that Cross sections and time have different intercepts which verified that random panel model is the most appropriate linear regression model for this relation.

Table 10-12 The random effect panel model of the second hypothesis H_2

Model	*Random effect Panel*	**Dependent variable**		ROE	**VIF Test**
Independent variables	***Coefficient***	***t-ratio***	***p-value***	**Significance**	
Constant	0.154201	0.8085	0.4195	**Insignificant**	
Gender diversity	−0.0186833	−0.1125	0.9105	**Insignificant**	1.045
Culture diversity	−0.352813	−2.456	0.0147	**Significant**	1.075
Education diversity	0.104807	16.63	<0.001	**Significant**	1.069
Firm size	0.0221492	2.863	0.0045	**Significant**	1.061
Leverage	−0.0497590	−0.7377	0.4614	**Insignificant**	1.065
F-test	2.713939	***p-value***		0.020664	
Ramsey Reset test	1.77299	***p-value***		0.2242418	
Heterosckadicity test	0.03300	***p-value***		0.693207	
Adjusted R-squared		13.0874%			

Source: Prepared by the researcher depending on E-views software output.

From table (3.12) it is concluded that:

- The overall random panel model is significant as the overall F-test for significance has a value of 2.713939 and *p-value* 0.020664 which is less than 0.05, with adjusted R-squared value of 13.0874% which means that the independent sub-

variables explain the change in the Return on Equity (ROE) by 13.0874%.

- Constant has insignificant impact on ROE. (dropped from equation)
- Gender diversity has an inverse and insignificant impact on ROE. (dropped from equation)
- Culture diversity has an inverse and significant impact on ROE.
- Education diversity has direct and significant impact on ROE.
- Firm size has direct and significant impact on ROE.
- Leverage has an inverse and insignificant impact on ROE. (dropped from equation)
- There is no problem of multi-collinearity between the independent variables as the VIF test showed result of one for the independent variable.
- Ramsey reset test has a *p-value* of 0.2242418 which is greater than 0.05, which means that the independent variables in the models are sufficient.
- Both Heterosckadicity test has *p-values* of 0.693207, which means that the residuals have a constant variance on long run and the model doesn't suffer from Heterosckadicity problem.
- The overall equation for forecasting the ROE is:

$$\widehat{ROE_{it}} = -0.352813\ \text{Culture}_{\text{it}} + 0.104807\ \text{Education}_{\text{it}} + 0.0221492\ \text{Size}_{\text{it}}$$

Therefore, the researcher will accept the second hypothesis which means that there is significant impact from board of directors' characteristics diversity on firms' performance (ROE).

10.9 Testing the third Hypothesis

For testing the impact of board of directors' characteristics diversity on firms' performance (EPS), the researcher will apply the panel diagnostics tests to determine the most appropriate linear panel regression to test that hypothesis.

Table 10-13 The pooled panel model diagnostics for the third hypothesis H_3

Test	Purpose	Test-statistic result	*P-value*	Fitted panel model
F-test	Comparing between Pooled panel and Fixed Effect Panel	F = 4.36683	1.56308e-013	Fixed effect
Breusch-Pagan test	Comparing between Pooled panel and Random Effect Panel	LM = 76.0627	2.74796e-018	Random effect
Hausman test	Comparing between Fixed Effect panel and Random Effect Panel	H = 6.32152	0.276179	Random effect

Source: Prepared by the researcher depending on E-views software output.

After comparing the three panel effects (pooled, fixed, and random) the researcher found that random linear panel regression is the most fitted model for forecasting Earnings per share (EPS).

Also, will apply and robustness check test to verify this model to be applied for any other sample from the study population.

Table 10-14 The robustness check test panel model diagnostics for the third hypothesis H_3

Test	Purpose	Test-statistic result	*P-value*	Fitted panel model
F-test for joint regressors' significance	The regressors' are jointly significant with the panel model	F = 11.596	<0.0001	Verified
Welch test for intercepts of different groups	Cross sections and time have a common intercept or one of them performed by different intercepts	F = 83.661	<0.0001	Cross sections or time have different intercepts

Source: Prepared by the researcher depending on E-views software output.

From the robustness check test, it was found that:

- The F-test for joint regressors' showed a significant impact of the dependent variable and constant on the dependent variable as its *p-value* is less than 0.05.
- Welch test for intercepts of different groups showed that Cross sections and time have different intercepts which verified that random panel model is the most appropriate linear regression model for this relation.

Table 10-15 The random effect panel model of the third hypothesis H_3

Model	*Random effect Panel*	**Dependent variable**		EPS
Independent variables	***Coefficient***	***t-ratio***	***p-value***	**Significance**
Constant	−6.75350	−0.6253	0.5324	**Insignificant**
Gender diversity	−0.628035	−0.3602	0.7190	**Insignificant**
Culture diversity	1.07310	1.024	0.3070	**Insignificant**
Education diversity	0.293748	0.1040	0.9172	**Insignificant**
Firm size	0.291841	1.297	0.1959	**Insignificant**
Leverage	0.291577	0.8081	0.4199	**Insignificant**
F-test	1.501843	***p-value***		0.189524

Source: Prepared by the researcher depending on E-views software output.

From table (3.15) it is concluded that:

- The overall random panel model is insignificant as the overall F-test for significance has a value of 1.501843 and *p-value* 0.189524 which is more than 0.05, which means that the independent sub-variables don't explain the change in the Earnings per share (EPS).
- Constant has insignificant impact on EPS. (dropped from equation)
- Gender diversity has insignificant impact on EPS. (dropped from equation)
- Culture diversity has insignificant impact on EPS. (dropped from equation)
- Education diversity has insignificant impact on EPS. (dropped from equation)
- Firm size has insignificant impact on EPS. (dropped from equation)
- Leverage has insignificant impact on EPS. (dropped from equation)

Therefore, the researcher will reject the third hypothesis which means that there is no significant impact from board of directors' characteristics diversity on firms' performance (EPS).

10.10 Testing the fourth Hypothesis

For testing the impact of board of directors' characteristics diversity on firms' performance (ROA) moderated by ESG firms' performance, the researcher will apply the panel diagnostics tests to determine the most appropriate linear panel regression to test that hypothesis.

Table 10-16 The pooled panel model diagnostics for the fourth hypothesis H_4

Test	Purpose	Test-statistic result	*P-value*	Fitted panel model
F-test	Comparing between Pooled panel and Fixed Effect Panel	F = 4.46794	6.1684e-014	Fixed effect
Breusch-Pagan test	Comparing between Pooled panel and Random Effect Panel	LM = 76.6233	2.06889e-018	Random effect
Hausman test	Comparing between Fixed Effect panel and Random Effect Panel	H = 10.4179	0.108122	Random effect

Source: Prepared by the researcher depending on E-views software output.

After comparing the three panel effects (pooled, fixed, and random) the researcher found that random linear panel regression is the most fitted model for forecasting Return on Assets (ROA).

Also, will apply and robustness check test to verify this model to be applied for any other sample from the study population.

Table 10-17 The robustness check test panel model diagnostics for the fourth hypothesis H_4

Test	Purpose	Test-statistic result	*P-value*	Fitted panel model
F-test for joint regressors' significance	The regressors' are jointly significant with the panel model	F = 10.165	<0.0001	Verified
Welch test for intercepts of different groups	Cross sections and time have a common intercept or one of them performed by different intercepts	F = 69.872	<0.0001	Cross sections or time have different intercepts

Source: Prepared by the researcher depending on E-views software output.

From the robustness check test it was found that:

- The F-test for joint regressors' showed a significant impact of the dependent variable and constant on the dependent variable as its *p-value* is less than 0.05.
- Welch test for intercepts of different groups showed that Cross sections and time have different intercepts which verified that random panel model is the most appropriate linear regression model for this relation.

Table 10-18 The random effect panel model of the fourth hypothesis H_4

Model	*Random effect Panel*	**Dependent variable**		ROA	
Independent variables	***Coefficient***	***t-ratio***	***p-value***	**Significance**	**VIF Test**
Constant	0.122287	1.910	0.0572	**Significant**	
Gender diversity	−0.100633	−2.467	0.0142	**Significant**	1.045
Culture diversity	−0.0892206	−4.081	<0.0001	**Significant**	1.084
Education diversity	0.0427962	3.260	0.0013	**Significant**	1.096
Firm size	0.00951454	3.829	0.0002	**Significant**	1.076
Leverage	−0.120980	−5.738	<0.0001	**Significant**	1.068
ESG Performance	0.0165969	1.829	0.0685	**Significant**	1.025
F-test	14.78827	***p-value***		1.47e-14	
Ramsey Reset test	0.3082	***p-value***		0.716166	
Heterosckadicity test	0.232	***p-value***		0.6267712	
Adjusted R-squared		24.5208%			

Source: Prepared by the researcher depending on E-views software output.

From table (3.18) it is concluded that:

- The overall random panel model is significant as the overall F-test for significance has a value of 14.78827 and *p-value* 1.47e-14 which is less than 0.05, with adjusted R-squared

value of 24.5208% which means that the independent sub-variables and moderator explain the change in the Return on Assets (ROA) by 24.5208%.

- Constant has significant impact on ROA. (at 10% significance level)
- Gender diversity has an inverse and significant impact on ROA.
- Culture diversity has an inverse and significant impact on ROA.
- Education diversity has direct and significant impact on ROA.
- Firm size has direct and significant impact on ROA.
- Leverage has an inverse and significant impact on ROA.
- ESG firms' performance has direct and significant impact on ROA. (at 10% significance level)
- There is no problem of multi-collinearity between the independent variables as the VIF test showed result of one for the independent variable.
- Ramsey reset test has a *p-value* of 0.716166 which is greater than 0.05, which means that the independent variables in the models are sufficient.
- Both Heterosckadicity test has *p-values* of 0.62677, which means that the residuals have a constant variance on long run and the model doesn't suffer from Heterosckadicity problem.
- The overall equation for forecasting the ROA is:

$$\widehat{ROA_{it}} = 0.122287 - 0.100633\ \mathrm{BGD_{it}} - 0.0892206\ \mathrm{Culture_{it}} + 0.0427962\ \mathrm{Education_{it}} + 0.00951454\ \mathrm{Size_{it}} - 0.120980\ \mathrm{Leverage_{it}} + 0.0165969\ \mathrm{ESG_{it}}$$

Therefore, the researcher will accept the fourth hypothesis which means that there is significant impact from board of directors' characteristics diversity on firms' performance (ROA) moderated by ESG firms' performance.

10.11 Testing the fifth Hypothesis

For testing the impact of board of directors' characteristics diversity on firms' performance (ROE) moderated by ESG firms' performance, the researcher will apply the panel diagnostics tests to determine the most appropriate linear panel regression to test that hypothesis.

Table 10-19 The pooled panel model diagnostics for the fifth hypothesis H_5

Test	Purpose	Test-statistic result	*P-value*	Fitted panel model
F-test	Comparing between Pooled panel and Fixed Effect Panel	F = 8.46662	3.64648e-028	Fixed effect
Breusch-Pagan test	Comparing between Pooled panel and Random Effect Panel	LM = 194.386	3.50821e-044	Random effect
Hausman test	Comparing between Fixed Effect panel and Random Effect Panel	H = 7.03611	0.31752	Random effect

Source: Prepared by the researcher depending on E-views software output.

After comparing the three panel effects (pooled, fixed, and random) the researcher found that random linear panel regression is the most fitted model for forecasting Return on Equity (ROE).

Also, will apply and robustness check test to verify this model to be applied for any other sample from the study population.

Table 10-20 The robustness check test panel model diagnostics for the fifth hypothesis H_5

Test	Purpose	Test-statistic result	*P-value*	Fitted panel model
F-test for joint regressors' significance	The regressors' are jointly significant with the panel model	F = 10.682	<0.0001	Verified
Welch test for intercepts of different groups	Cross sections and time have a common intercept or one of them performed by different intercepts	F = 72.112	<0.0001	Cross sections or time have different intercepts

Source: Prepared by the researcher depending on E-views software output.

From the robustness check test it was found that:

- The F-test for joint regressors' showed a significant impact of the dependent variable and constant on the dependent variable as its *p-value* is less than 0.05.
- Welch test for intercepts of different groups showed that Cross sections and time have different intercepts which verified that random panel model is the most appropriate linear regression model for this relation.

Table 10-21 The random effect panel model of the fifth hypothesis H_5

Model	*Random effect Panel*	**Dependent variable**		ROE	
Independent variables	***Coefficient***	***t-ratio***	***p-value***	**Significance**	**VIF Test**
Constant	−0.0190029	−0.1703	0.8649	**Insignificant**	
Gender diversity	0.00664194	0.08287	0.9340	**Insignificant**	1.045
Culture diversity	−0.363838	−6.288	<0.0001	**Significant**	1.084
Education diversity	0.371519	11.28	<0.0001	**Significant**	1.096
Firm size	0.0177180	5.008	<0.0001	**Significant**	1.076
Leverage	0.0356107	1.273	0.2041	**Insignificant**	1.068
ESG Performance	0.0264620	13.05	<0.0001	**Significant**	1.025
F-test	11.36286	***p-value***		2.72e-11	
Ramsey Reset test	0.43667	***p-value***		0.127412	
Heteroskadicity test	0.2448	***p-value***		0.219279	
Adjusted R-squared		18.7746%			

Source: Prepared by the researcher depending on E-views software output.

From table (3.21) it is concluded that:

- The overall random panel model is significant as the overall F-test for significance has a value of 11.36286 and *p-value* 2.72e-11 which is less than 0.05, with adjusted R-squared value of 18.7746% which means that the independent sub-variables and moderator explain the change in the Return on Equity (ROE) by 18.7746%.
- Constant has insignificant impact on ROE. (dropped from equation)
- Gender diversity has an inverse and insignificant impact on ROE. (dropped from equation)
- Culture diversity has an inverse and significant impact on ROE.
- Education diversity has direct and significant impact on ROE.
- Firm size has direct and significant impact on ROE.
- Leverage has an inverse and insignificant impact on ROE. (dropped from equation)
- ESG firms' performance has direct and significant impact on ROE.
- There is no problem of multi-collinearity between the independent variables as the VIF test showed result of one for the independent variable.
- Ramsey reset test has a *p-value* of 0.2242418 which is greater than 0.05, which means that the independent variables in the models are sufficient.

- Both Heterosckadicity test has *p-values* of 0.693207, which means that the residuals have a constant variance on long run and the model doesn't suffer from Heterosckadicity problem.
- The overall equation for forecasting the ROE is:

$$\widehat{ROE_{it}} = -0.363838\ \text{Culture}_{\text{it}} + 0.371519\ \text{Education}_{\text{it}} + 0.0177180\ \text{Size}_{\text{it}} + 0.0264620\ \text{ESG}_{\text{it}}$$

Therefore, the researcher will accept the fifth hypothesis which means that there is significant impact from board of directors' characteristics diversity on firms' performance (ROE) moderated by ESG firms' performance.

10.12 Testing the sixth Hypothesis

For testing the impact of board of directors' characteristics diversity on firms' performance (EPS) moderated by ESG firms' performance, the researcher will apply the panel diagnostics tests to determine the most appropriate linear panel regression to test that hypothesis.

Table 10-22 The pooled panel model diagnostics for the sixth hypothesis H_6

Test	Purpose	Test-statistic result	*P-value*	Fitted panel model
F-test	Comparing between Pooled panel and Fixed Effect Panel	F = 4.40759	1.12436e-013	Fixed effect
Breusch-Pagan test	Comparing between Pooled panel and Random Effect Panel	LM = 75.7243	3.26168e-018	Random effect
Hausman test	Comparing between Fixed Effect panel and Random Effect Panel	H = 7.94959	0.24182	Random effect

Source: Prepared by the researcher depending on E-views software output.

After comparing the three panel effects (pooled, fixed, and random) the researcher found that random linear panel regression is the most fitted model for forecasting Earnings per share (EPS).

Also, will apply and robustness check test to verify this model to be applied for any other sample from the study population.

Table 10-23 The robustness check test panel model diagnostics for the sixth hypothesis H_6

Test	Purpose	Test-statistic result	*P-value*	Fitted panel model
F-test for joint regressors' significance	The regressors' are jointly significant with the panel model	F = 11.986	<0.0001	Verified
Welch test for intercepts of different groups	Cross sections and time have a common intercept or one of them performed by different intercepts	F = 72.663	<0.0001	Cross sections or time have different intercepts

Source: Prepared by the researcher depending on E-views software output.

From the robustness check test it was found that:

- The F-test for joint regressors' showed a significant impact of the dependent variable and constant on the dependent variable as its *p-value* is less than 0.05.
- Welch test for intercepts of different groups showed that Cross sections and time have different intercepts which verified that random panel model is the most appropriate linear regression model for this relation.

Table 10-24 The random effect panel model of the sixth hypothesis H_6

Model	*Random effect Panel*	**Dependent variable**		EPS
Independent variables	***Coefficient***	***t-ratio***	***p-value***	**Significance**
Constant	−11.2637	−1.002	0.3176	**Insignificant**
Gender diversity	−0.537220	−0.3086	0.7579	**Insignificant**
Culture diversity	0.877024	0.8314	0.4067	**Insignificant**
Education diversity	0.492608	0.1746	0.8615	**Insignificant**
Firm size	0.477691	1.833	0.1833	**Insignificant**
Leverage	0.284713	0.7908	0.4299	**Insignificant**
F-test	0.135175	***p-value***		0.752320

Source: Prepared by the researcher depending on E-views software output.

From table (3.24) it is concluded that:

- The overall random panel model is insignificant as the overall F-test for significance has a value of 1.501843 and *p-value* 0.752320 which is more than 0.05, which means that the independent sub-variables and moderator don't explain the change in the Earnings per share (EPS).
- Constant has insignificant impact on EPS. (dropped from equation)
- Gender diversity has insignificant impact on EPS. (dropped from equation)
- Culture diversity has insignificant impact on EPS. (dropped from equation)
- Education diversity has insignificant impact on EPS. (dropped from equation)
- Firm size has insignificant impact on EPS. (dropped from equation)
- Leverage has insignificant impact on EPS. (dropped from equation)

- ESG firms' performance has insignificant impact on EPS. (dropped from equation)

Therefore, the researcher will reject the sixth hypothesis which means that there is no significant impact from board of directors' characteristics diversity on firms' performance (EPS) moderated by ESG firms' performance.

10.13 Discussion

The discussion part is divided into two parts:

Board of directors' characteristics diversity on firms' performance.

The findings showed that the board of directors diversity had a significant effect on the firm performance, and that there gender, culture diversity, and Leverage has an inverse and significant effect on the return on assets, while the education and firm size had a direct and significant effect on the return on assets.

On the other hand, the results showed that the board of directors diversity has an insignificant effect on return on equity, as well as the gender diversity and leverage had an inverse and insignificant effect on return on equity too, but the culture diversity has an inverse and significant effect on the return on equity, while the education diversity and the firm size had a direct and significant effect on the return on equity.

While the Earnings per share had a different result and it led to that the board of directors diversity had an insignificant effect on EPS as follows; that gender diversity, culture diversity, education

diversity, firm size and leverage has an insignificant effect on EPS. This could lead us to know that the insignificancy has the reason behind these factors such as market conditions, industry dynamics, and firm-specific variables can overshadow the influence of board diversity on EPS.

Board of directors' characteristics diversity on firms' performance moderated by ESG firms' performance.

The findings showed that the board of directors diversity had a significant effect on ESG firm performance, while the gender diversity, culture diversity, and the leverage has an inverse and significant effect on return on assets, and the results showed that the education diversity and the firm size had a direct and significant effect on the return on assets. Lastly, the moderator ESG firms' performance had a direct and significant effect on the return on assets.

The outcomes showed that the gender diversity and leverage had an inverse and insignificant effect on the return on equity, thus the culture diversity had an inverse and significant effect on the return on equity, while education diversity, firm size and the ESG firms' performance had a direct and significant effect on return on equity.

After all, the earnings per share testing resulted that the gender diversity, culture diversity, education diversity, firm size, leverage, and ESG firms' performance had an insignificant effect on the earnings per share.

10.14 Recommendations

Based on the research results, the research recommendations are as following:

1- Promote Gender and Cultural Diversity on Boards: Encourage companies to actively seek gender and cultural diversity in their board compositions. This can be achieved through targeted recruitment processes and diversity plans. Diverse perspectives at the board level can lead to better decision-making and governance practices.

2- Provide Diversity Training and Education: Offer training and development opportunities for board members to enhance their understanding of diversity issues and inclusive leadership practices.

3- Measure and Monitor Diversity Outcomes: Establish key performance indicators (KPIs) and metrics to track progress on board diversity initiatives and their impact on organizational outcomes, including ROA. Regularly assess and report on diversity metrics to stakeholders, including shareholders, employees, customers, and the broader community. Use data-driven insights to inform decision-making and drive continuous improvement efforts in diversity and governance practices.

4- Raise a Culture of Presence: Develop a complete boardroom culture that values and respects diverse viewpoints, backgrounds, and contributions

5- Cross-Country Analysis: Conduct comparative studies across different countries to explore how cultural, regulatory, and institutional factors influence the relationship between BOD diversity and ESG performance.
6- Sector-Specific Analysis: Explore how the relationship between BOD diversity and ESG performance varies across different industry sectors, considering the unique sustainability challenges and opportunities they face.

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