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ESG Performance, Corporate Governance, and Firm Value: Evidence from Global Oil and Gas Companies

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Abstract

Background: Global oil and gas companies face increasing pressure from the energy transition and rising ESG expectations, requiring firm value assessment beyond traditional financial indicators to include environmental, social, and governance (ESG) performance and corporate governance quality.
Objective: This study examines the effect of ESG performance, board size, board independence, director busyness, board diversity, and ownership concentration on firm value, with financial performance as a mediating variable in global oil and gas companies during 2020–2024.
Methods: A quantitative panel data approach is employed, with firm value measured using price-to-book value (PBV). The analysis applies a Fixed Effects Model with Driscoll–Kraay standard errors, bootstrap mediation analysis, and robustness checks separating U.S. and non-U.S. firms.
Results: ESG performance has a positive but only marginally significant effect on firm value, which becomes insignificant after controlling for financial performance. Financial performance does not mediate the ESG–firm value relationship. Among governance variables, only board size has a significant positive effect on firm value, while board independence, director busyness, board diversity, and ownership concentration are not statistically significant. Robustness tests confirm overall consistency, with observable contextual differences across regions.
Conclusion: Firm value in global oil and gas companies is primarily driven by board size as a proxy for monitoring capacity and strategic resources, rather than ESG performance or other governance mechanisms, emphasizing the importance of aligning governance structure with operational efficiency and long-term value creation.

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INTRODUCTION

Global oil and gas companies are facing significant pressures related to sustainability as the demands of the energy transition, the Paris Agreement, and the SDGs increase, prompting investors to demand environmental impact reduction and adoption of sustainable business practices (Dsouza & Krishnamoorthy, 2024; Ramírez-Orellana et al., 2023). The case of hedge fund activist Engine No. 1 who succeeded in displacing ExxonMobil's board members in 2021 is a clear example of how ESG pressures are now having a direct impact on corporate governance. Strong ESG performance is believed to strengthen investors' reputation and trust, potentially increasing the company's value, while failure to manage ESG issues can trigger sanctions, lawsuits, and divestments (García-Amate et al., 2023). Therefore, ESG performance is now an important non-financial performance indicator that investors pay attention to in addition to traditional financial

performance (Aydoğmuş et al., 2022).

Corporate governance practices are crucial in the global oil and gas industry given the operational complexity and diversity of stakeholders. In the context of this study, corporate governance refers to the structural mechanisms of board oversight and ownership arrangements, specifically board size, board independence, busy directors, board diversity, and ownership concentration, rather than to the broader normative framework of Good Corporate Governance (GCG). The principles of transparency, accountability, and responsibility play an important role in building stakeholder trust (Ben Fatma & Chouaibi, 2023). The Petrobras scandal and the Petronas transparency issue are clear evidence that governance failures can damage reputations, trigger legal risks, and lower investor confidence. Governance factors such as board size, board independence, busy directors, board diversity, and ownership concentration are believed to affect the effectiveness of supervision and strategic decision-making (Chaabouni et al., 2025; Kao et al., 2019). Although empirically the impact is not always significant if it is only a formality. Theoretically, GCG helps to reduce agency conflicts between management and shareholders through oversight mechanisms, board independence, reporting transparency, and accountability enforcement, so that management's opportunistic behavior can be reduced and the interests of all shareholders are better protected (Jensen & Meckling, 1976; Salim et al., 2022).

Corporate governance mechanisms play an important role in suppressing agency conflicts and opportunistic management behaviors that can harm companies, while building investor trust through management transparency, financial reporting, and social responsibility (Tripathi et al., 2024). Companies with effective corporate governance mechanisms, such as board diversity and optimal capital structures, tend to have better market performance and wider access to funding. In the framework of agency theory, governance aims to minimize opportunistic behavior between agents (managers) and various principals such as shareholders, creditors, and other stakeholders, so that indirectly, the better the governance of a company, the higher the value of the company (Tripathi et al., 2024). Companies that pay attention to ESG and governance also indirectly maintain long-term business sustainability, considering that damage to the business environment can have a direct impact on the business activities themselves.

In previous studies, the topic of ESG and Firm Value as well as GCG and Firm Value It has been done quite a lot and has quite a variety of measurement methods. Some studies separate the three ESG components, as well as use overall ESG scores or scores. Aydoğmuş (2022) provide an explanation related to ESG scores that have a positive and significant effect on the company's value, but if tested individually, the environmental aspect does not have a significant relationship with Firm Value, while the social and governance aspects show a positive and significant relationship. Different results were obtained in the study Putra (2024), where they found that ESG had no direct effect on company value. However, ESG increases ROA, and the increase in ROA contributes positively to PBV, so the influence of ESG on a company's value occurs through financial performance. In other words, the influence of ESG on company value occurs indirectly through ROA.

Research related to engagement busy directors in the company has also been done. Cooper (2022) conducting relationship research busy directors on ESG performance in a company and found a positive relationship between busy directors and ESG performance. Then for other corporate governance factors, research has also been carried out by Ben (2023) where to Board Size, Board Independence, and ownership concentration there is a negative correlation to Firm Value, while Board Diversity has a positive influence on Firm Value.

So far, research related to ESG performance, Board Size, Board Independence, ownership concentration, Board Diversity, and busy directors against company value, the majority of which are carried out in the public sector of public companies or financial companies and has not been done for certain sectors such as oil and gas companies (Aydoğmuş et al., 2022; Ben Fatma & Chouaibi, 2023; Cooper & Uzun, 2022; Putra & Budastra, 2024).

This study uses a sample of global oil and gas companies listed on various country exchanges for the 2020–2024 period, with the consideration that the oil and gas industry is highly visible and carbon-intensive so that it faces high ESG pressure and has complex and large-scale characteristics so that the quality of governance is very relevant. Global coverage allows for a broader comparison of the variations in ESG and governance practices in the international investor ecosystem. This study aims to examine the influence of ESG performance on company

value, the role of financial performance mediation in the relationship between ESG and company value, the influence of board characteristics on company value, and the effect of ownership concentration on company value.

Based on the theoretical arguments and previous empirical findings, this study formulates the following hypotheses:

H1a: ESG performance positively affects financial performance.
H1b: Financial performance positively affects firm value.
H1c: ESG performance positively affects firm value.
H1d: Financial performance fully mediates the relationship between ESG performance and firm value.
H2: Board size positively affects firm value.
H3: Board independence negatively affects firm value.
H4: Busy directors positively affect firm value.
H5: Board diversity positively affects firm value.
H6: Ownership concentration negatively affects firm value.

METHOD

This study aimed to examine the influence of ESG performance on firm value by mediating financial performance (ROA), as well as the influence of governance characteristics (board size, board independence, busy directors, board diversity, and ownership concentration) on firm value in public oil and gas companies with a one-tier board structure listed on various global stock exchanges over the 2020–2024 period.

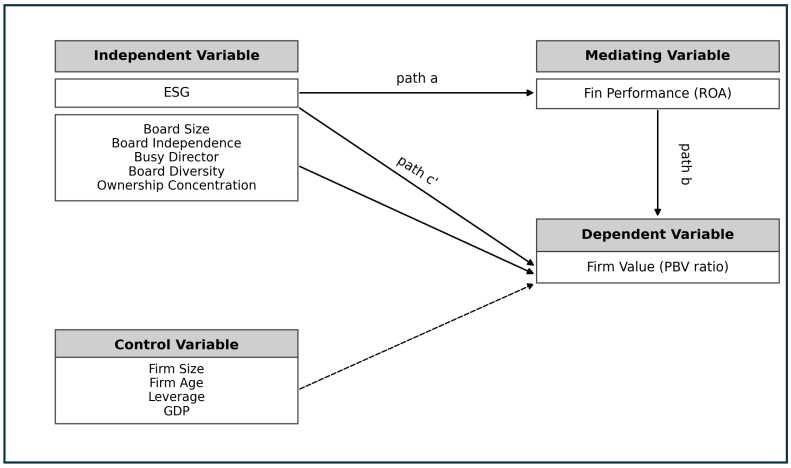

Figure 1. Research Framework

The data were sourced from Refinitiv and the companies' annual reports, with a final sample of 54 companies and 270 firm-year observations selected through purposive sampling. Firm value was measured using PBV, ESG performance using Refinitiv scores, and financial performance using ROA, while control variables included firm size, firm age, leverage, and GDP growth.

Table 1. Variable Measurement

Variable	Symbol	Measurement
Firm value	PBV	Market price per share divided by book value per share
ESG performance	ESG	Refinitiv ESG score, 0-100
Financial performance	ROA	Net income divided by total assets
Board size	LNBDSZ	Natural logarithm of the total number of non-executive directors

Board independence	KINDEP	Proportion of independent directors to total non-executive directors
Busy directors	BD	Proportion of non-executive directors with at least two concurrent directorships
Board diversity	BLAU	Blau index of gender diversity, from 0 to 0.5
Ownership concentration	OWNC	Proportion of shares held by the ten largest shareholders
Firm size	FSZ	Natural logarithm of total assets
Firm age	FAGE	Natural logarithm of firm age
Leverage	LEV	Total debt divided by total assets
GDP growth	GDPGR	Annual percentage change in country-level GDP

Source: Processed by the author(s) from Refinitiv and annual reports

The tests were carried out using panel data regression through three equations to assess both direct effects and mediation, with model selection conducted using the Chow, Hausman, and Lagrange Multiplier tests. Hypothesis testing was performed using the F-test, t-test, and coefficient of determination, all processed using Stata.

$$ROA_{it} = \alpha_1 + \beta_1 ESG_{it} + \beta_2 FSZ_{it} + \beta_3 FAGE_{it} + \beta_4 LEV_{it} + \beta_5 GDPGR_{it} + \varepsilon \quad (3.1)$$

$$PBV_{it} = \alpha_2 + \gamma_1 ESG_{it} + \gamma_2 LNBDSZ_{it} + \gamma_3 KINDEP_{it} + \gamma_4 BD_{it} + \gamma_5 BLAU_{it} + \gamma_6 OWNC_{it} + \gamma_7 FSZ_{it} + \gamma_8 FAGE_{it} + \gamma_9 LEV_{it} + \gamma_{10} GDPGR_{it} + \varepsilon \quad (3.2)$$

$$PBV_{it} = \alpha_3 + \delta_1 ESG_{it} + \delta_2 ROA_{it} + \delta_3 LNBDSZ_{it} + \delta_4 KINDEP_{it} + \delta_5 BD_{it} + \delta_6 BLAU_{it} + \delta_7 OWNC_{it} + \delta_8 FSZ_{it} + \delta_9 FAGE_{it} + \delta_{10} LEV_{it} + \delta_{11} GDPGR_{it} + \varepsilon \quad (3.3)$$

RESULTS AND DISCUSSION

Results

Descriptive Statistics

Table 2. Descriptive Statistics Before Winsorization

Variable	Type	N	Red	Std. Dev.	Min	Med	Max
PBV	Dependency	270	1,664	1,049	0,275	1,334	5,834
LONG	Mediation	270	0,049	0,105	-0,760	0,051	0,486
ESG	Independent	270	63,248	15,959	12,563	65,756	93,168
LNBDSZ	Independent	270	2,373	0,236	1,792	2,398	2,996
CHILDEP	Independent	270	0,716	0,211	0,154	0,8	1
BD	Independent	270	0,764	0,248	0	0,833	1
BLAU	Independent	270	0,359	0,123	0	0,397	0,5
OWNC	Independent	270	0,475	0,194	0,102	0,458	0,949
FSZ	Controls	270	10,134	1,297	7,282	9,892	13,025
FAGE	Controls	270	3,307	0,851	1,099	3,238	4,956
LEV	Controls	270	0,272	0,122	0,002	0,268	0,777
GDPGR	Controls	270	0,019	0,038	-0,109	0,025	0,120

Source: Processed from Stata19

Descriptive statistics show that the average ESG score of the sample is 63.25 with considerable variation (12.56–93.17), reflecting the diversity in the quality of sustainability implementation among oil and gas companies. Firm value proxied by PBV has an average of 1.664 with a right-leaning distribution, indicating that some companies are getting a premium valuation from the market. Financial performance (ROA) averaged 4.9% with a wide spread due to the

volatility of the oil and gas industry's profitability between years. In terms of governance, the average board size is equivalent to 11 members, board independence is quite high at 71.6%, busy directors are very high at 76.4%, non-executives concurrently hold at least two positions, and board diversity is at a moderate level with an average Blau index of 0.359. The average ownership concentration of 47.5% indicates that the sample includes companies with scattered to highly concentrated ownership. The control variables describe a diverse sample: average firm size equivalent to USD 25.2 billion, average firm age of 27 years, moderate leverage of 27.2%, and average GDP growth of 1.9% with variations reflecting differences in macroeconomic conditions between countries, including the contraction due to the pandemic in 2020.

To improve the quality of the data and reduce distortion due to extreme values, this study applies the winsorization process to one main variable. This process aims to trim *outliers* at the upper and lower limits of the data distribution, so that regression analysis becomes more *robust* and not affected by unrepresentative extreme observations. The following table presents the descriptive statistical values of the variables after the winsorization process is performed:

Table 3. Descriptive Statistics After Winsorization

Variable	Red	Std. Dev.	Min	Med	Max
ROA_w	0,050	0,091	-0,308	0,051	0,270

Source: Processed from Stata19

The winsorization process on the ROA variable resulted in a fairly noticeable improvement in distribution, where the minimum value increased from -0.76 to -0.308 and the maximum value decreased from 0.486 to 0.27, so that the data range was more controlled. The standard deviation decreased from 0.105 to 0.091 and the kurtosis dropped sharply from 17.07 to 5.22, indicating that the extreme observations that previously dominated the distribution were successfully controlled, while the average value remained stable at around 0.05. Overall, winsorization has succeeded in reducing the influence of outliers and improving data quality so that the results of panel regression estimation using ROA_w can be considered more reliable.

Regression Data Panel

Table 4. Chow Test Results for Estimation Model Selection

No.	Research Model	F-statistic	*p-value*	Conclusion
1	ESG → ROA_w	1,63	0,0083	Fixed Effects Model
2	ESG + Governance → PBV	7,75	0,0000	Fixed Effects Model
3	ESG + ROA_w + Governance → PBV	7,55	0,0000	Fixed Effects Model

Source: Processed from Stata19

Based on Table 3, the results of the Chow Test show that in Model 1, an F-statistical value of 1.63 with a p-value of 0.0083 was obtained, which is smaller than 0.05. Thus, the fixed effects model is more appropriate than the common effects model. These results show that there are significant differences in individual characteristics between companies that need to be controlled in the financial performance model. In Model 2, the results of the Chow Test showed an F-statistic of 7.75 with a p-value of 0.0000, which is also smaller than 0.05. Therefore, the fixed effects model is again more appropriate to be used than the common effects model. This means that there is individual heterogeneity between companies that affects firm value, so the common effects approach is inadequate. Furthermore, in Model 3, an F-statistic of 7.55 with a p-value of 0.0000 was obtained, which is still less than 0.05. Thus, the most suitable model to use is the fixed effects model. These results confirm that even after including the mediating variable in the form of financial performance, the difference in fixed characteristics between firms still affects firm value and needs to be accommodated in the model estimation.

Table 5. Hausman Test Results for Estimation Model Selection

No.	Research Model	Chi²	*p-value*	Conclusion
1	ESG → ROA_w	26,67	0,0001	Fixed Effects Model
2	ESG + Governance → PBV	59,00	0,0000	Fixed Effects Model
3	ESG + ROA_w + Governance → PBV	68,57	0,0000	Fixed Effects Model

Source: Processed from Stata19

The results of the Hausman Test in all three research models consistently showed a p-value below 0.05 (Model 1: χ^2=26.67; Model 2: χ^2=59.00; Model 3: χ^2=68.57), so that the fixed effects model is chosen as a more accurate estimation approach than random effects on the entire equation. This indicates that there is a significant correlation between individual characteristics of companies that are not observed with independent variables, so that fixed heterogeneity between global oil and gas companies needs to be explicitly controlled through a fixed effects approach, both in the financial performance model and firm value (Baltagi, 2005; Hausman, 1978; Wooldridge, 2010).

Classical Assumption Test Results

Normality Test

The residual normality test is not shown as the main test in this study because in the analysis of panel data with a relatively adequate number of observations, the assumption of normality is not the most decisive condition for the validity of estimates and inferences, especially when the study emphasizes the use of the Robust to overcome the violation of classical assumptions. In this context, methodological attention is more appropriately directed to testing multicollinearity, autocorrelation, and heteroscedasticity, since these aspects are more relevant in determining model accuracy and reliability Standard Error on the panel regression used (Baltagi, 2005; Gujarati, 2021; Wooldridge, 2010).

Multicollinearity test

Table 6. VIF Multicollinearity Test Results

No.	Research Model	BRIGHT RED	Conclusion
1	ESG → ROA_w	3,15	No symptoms of multicollinearity
2	ESG + Governance → PBV	2,77	No symptoms of multicollinearity
3	ESG + ROA_w + Governance → PBV	3,04	No symptoms of multicollinearity

Source: Processed from Stata19

Table 7. Pearson Correlation Test Results

	PBV	ROA_w	ESG	LNBDSZ	KINDEP	BD	BLAU	OWNC	FSZ	FAGE	LEV	GDPGR
PBV	1.0000											
ROA_w	0.0454	1.0000										
ESG	-0.2738	-0.0107	1.0000									
LNBDSZ	-0.2642	-0.0514	0.4371	1.0000								
KINDEP	0.1647	0.1000	0.0223	-0.2410	1.0000							
BD	0.1309	-0.0468	0.2078	-0.1916	0.0067	1.0000						
BLAU	0.1246	0.1083	0.2557	-0.0500	0.5342	0.2040	1.0000					
OWNC	0.1387	-0.0025	-0.3112	-0.1630	-0.3497	-0.1990	-0.4915	1.0000				
FSZ	-0.2131	0.0710	0.5501	0.4019	0.2274	0.0999	0.2542	-0.3807	1.0000			
FAGE	-0.2685	0.0199	0.3853	0.0498	0.0327	0.1929	0.1801	-0.2153	0.2854	1.0000		
LEV	0.1490	-0.3831	-0.1738	-0.0233	-0.2876	-0.1767	-0.3851	0.2018	-0.2958	-0.2437	1.0000	
GDPGR	0.1421	0.4512	-0.0509	-0.1268	0.1185	0.0614	0.0709	0.0284	0.0071	0.0291	-0.1229	1.0000

Source: Processed from Stata19

The multicollinearity test using VIF in the three research models resulted in a mean VIF of 3.15, 2.77, and 3.04, all of which were well below the threshold, so that no serious symptoms of

multicollinearity were found. This result is strengthened by the Pearson Correlation test which shows that the correlation between independent variables is at a low to moderate level. Some relatively prominent correlations include ESG with firm size (0.55) and board size (0.44), board independence with board diversity (0.53), and ownership concentration which correlates negatively with board diversity (-0.49) and board independence (-0.35), indicating that companies with more concentrated ownership tend to have less independent and less diverse boards. In terms of control variables, firm size is negatively correlated with PBV (-0.21) and leverage is negatively correlated with ROA (-0.38), which is in line with the logic that large companies do not always have premium valuations and high debt depresses profitability. Overall, both tests confirm that the research model is free from multicollinearity problems and is feasible to proceed to the panel regression estimation stage.

Autocorrelation Test

Table 8. Autocorrelation Test Results

No.	Research Model	F-statistic	*p-value*	Conclusion
1	ESG → ROA_w	54,679	0,00000	There is an autocorrelation
2	ESG + Governance → PBV	45,623	0,00000	There is an autocorrelation
3	ESG + ROA_w + Governance → PBV	40,291	0,00000	There is an autocorrelation

Source: Processed from Stata19

The results of the autocorrelation test showed that in Model 1, Model 2, and Model 3 all obtained a Prob > F value of 0.0000, so it can be concluded that all three models experienced autocorrelation. These findings suggest that errors in one period are still correlated with errors in previous periods, so the assumption of no autocorrelation is not met. Therefore, to maintain the validity of statistical inference, this study uses Driscoll–Kraay Standard Errors. This approach is relevant because Driscoll (1998) show that the estimator is capable of producing Standard Error robust to the most common forms of spatial and temporal dependence, and is a viable alternative when Standard Error is potentially inconsistent due to the correlation in Error Term.

Heteroskedasticity Test

Table 9. Heteroskedasticity Test Results

No.	Models	Chi^2	*p-value*	Conclusion
1	ESG → ROA_w	11870,99	0,0000	There is heteroskedasticity
2	ESG + Governance → PBV	18982,65	0,0000	There is heteroskedasticity
3	ESG + ROA_w + Governance → PBV	20446,24	0,0000	There is heteroskedasticity

Source: Processed from Stata19

The heteroscedasticity test showed that all research models experienced heteroscedasticity, characterized by a p-value below 0.05, which means that the residual variance is not constant between companies. This condition is normal in the oil and gas industry considering that each company has different operational characteristics, cost structure, asset size, and risk profile, while firm value is also strongly influenced by external factors such as oil prices, global investor sentiment, and energy transition pressures. Therefore, to maintain the validity of statistical inference, model estimates are corrected using Driscoll–Kraay standard errors which are more reliable in handling heteroscedasticity and autocorrelation in the panel data (Gujarati, 2021; Wooldridge, 2010).

Estimation Model Selection

This study uses the Fixed Effects Model as the main estimation method based on the results of the Chow Test and the Hausman Test which consistently show that the fixed effects approach is more suitable to accommodate unobserved heterogeneity between firms (Baltagi, 2005; Wooldridge, 2010).

Since all models experienced heteroscedasticity and autocorrelation confirmed through the Modified Wald test and Wooldridge test, the final estimate used Driscoll–Kraay standard errors which are more reliable against temporal dependencies and error structure disturbances

in the panel data (Driscoll & Kraay, 1998).

Mediation testing refers to Baron (1986) framework through three regression equations, complemented by a bootstrap mediation test to test the significance of indirect effects more reliably because the distribution of indirect effects is often asymmetrical (Alfons et al., 2022). As a robustness test, the sample was separated into groups of US and non-US companies to assess the consistency of the results and ensure the key findings were not solely influenced by the dominance of US companies which accounted for 21 of the 54 companies in the sample. The combination of this approach is expected to produce valid estimates and reliable statistical inference in explaining the relationship between ESG, corporate governance, financial performance, and firm value in global oil and gas companies.

Regression Results and Hypothesis Tests

Based on the selection of the previous estimation model, namely the fixed effects model with Driscoll–Kraay standard errors, the results of regression and hypothesis testing were obtained as follows.

Table 10. Model 1, 2 and 3 Regression Results

Variable	Koef. (*P-value)*		
	Model 1 ROA_w	**Model 2 PBV**	**Model 3 Dependent: PBV Mediator: ROA_w**
ESG	0,0007 (0,210)	0,0116* (0,096)	0,0112 (0,108)
ROA_w	-	-	0,7118* (0,094)
LNBDSZ	-	0,6983*** (0,002)	0,7014*** (0,002)
KINDEP	-	-0,3787 (0,509)	-0,3978 (0,465)
BD	-	0,0446 (0,729)	0,0682 (0,622)
BLAU	-	0,5454 (0,328)	0,5683 (0,328)
OWNC	-	0,8515 (0,164)	0,8817 (0,164)
FSZ	0,0683* (0,053)	-1,8372*** (0,000)	-1,8857*** (0,000)
FAGE	0,0590 (0,421)	-0,3652 (0,146)	-0,4106* (0,097)
LEV	-0,3976* (0,052)	2,1142*** (0,006)	2,4015*** (0,009)
GDPGR	-0,5266* (0,061)	1,1629 (0,510)	1,4969 (0,347)
R-squared	0,6365	0,3872	0,3905
Prob > F	0,0008	0,0029	0,0027
N	270	270	270

Description: *p-value*; *p < 0.10, **p < 0.05, *** p < 0.01
Source: Processed from Stata19

All three research models were overall significant based on the Prob > F value below 0.05. Model 1 (ROA_w) has an R-squared within 63.65%, indicating a strong ability to explain variations in financial performance over time within the same company. Model 2 (PBV without mediator) and Model 3 (PBV with ROA_w as mediator) have R-squared within 38.72% and 39.05%, respectively, with a very small increase in Model 3, indicating that the addition of ROA_w only provides a definite addition of power that is limited to the variation in firm value. Although not all variables are partially significant, the combination of all independent variables in the three models still makes a meaningful contribution in explaining the financial performance and firm value of global oil and gas companies during the study period.

Discussion

The Effect of ESG Performance on Financial Performance

In the H1a Hypothesis, ESG performance is estimated to have a positive effect on financial performance. In Model 1, the ESG variable had a result of 0.0007 with a positive, but not statistically significant direction and a p-value of 0.210. Thus, the H1a hypothesis is rejected.

These findings show that the increase in ESG scores in global oil and gas companies has not been able to significantly increase ROA during the observation period. Theoretically, ESG is often associated with operational efficiency, better reputation, reduced risk, and strengthened relationships with stakeholders, which can ultimately support a company's profitability (Aydoğmuş et al., 2022; Putra & Budastra, 2024). However, the literature also shows that in certain sectors, especially capital-intensive and high-risk sectors, ESG priority is not always immediately followed by improvements in short-term financial performance due to relatively large implementation costs, adjustment costs, and upfront investments (Chaabouni et al., 2025).

In the context of the global oil and gas industry, this result is quite reasonable because the oil and gas sector is carbon-intensive, environmentally sensitive, capital intensive, and heavily influenced by energy price fluctuations, operational risks, and regulatory pressures and energy transition (Adiwardhana et al., 2025; Shah et al., 2022). In other words, while ESG is strategically important, its influence on financial performance in the short term is not statistically strong enough.

The Effect of Financial Performance on Firm Value

In the H1b Hypothesis, financial performance is estimated to have a positive effect on firm value. In Model 3, the ROA_w variable has a coefficient of 0.7118 with a positive direction and is significant at the level of 10% with a p-value of 0.094. Thus, the H1b hypothesis is accepted at a significance level of 10%.

These results show that increased company profitability is related to increased Firm Value. Theoretically, better profitability signals that the company is able to manage assets efficiently, generate higher returns, and have a stronger cash flow outlook in the future, thereby improving the market valuation of the company (Putra & Budastra, 2024).

In the global oil and gas industry, ROA is an important signal because profitability reflects a company's ability to manage large assets and complex operational projects. Although the firm value of oil and gas companies is also influenced by energy prices, geopolitical risks, and energy policies, these results show that the market still responds to profitability as an indicator of the company's ability to create value.

The Influence of ESG Performance on Firm Value

In the H1c Hypothesis, ESG performance is estimated to have a positive effect on firm value. In Model 2, the ESG variable has a coefficient of 0.0116 with a positive direction and is significant at the level of 10% with a p-value of 0.096. Thus, the H1c hypothesis is accepted at a significance level of 10%.

These results show that the increase in ESG Performance can improve Firm Value, although the level of significance is still weak. Theoretically, ESG can be a positive signal for investors because it shows a company's commitment to managing environmental, social, governance, regulatory pressures, and demands Squirrel. ESG can also strengthen company legitimacy, especially in the oil and gas sector which has high environmental and social risks (Aydoğmuş et al., 2022; Shah et al., 2022).

However, when ROA_w included in Model 3, the ESG coefficient remained positive at 0.0112, but no longer significant with a p-value of 0.108. This decrease in significance occurred because the Model 3 took control Financial Performance, so that some of the market valuations of PBVs that could previously be attributed to ESG are also explained by ROA_w. In other words, investors not only assess ESG as a sustainability signal, but also see whether it is already reflected in the company's profitability. This mechanism is in line with the view that Financial Performance can be a path that translates ESG practices into firm value (Putra & Budastra, 2024).

In the context of global oil and gas companies, this is natural because ESG is more seen as a risk mitigation strategy and long-term legitimacy, while firm value in the short term is still

heavily influenced by profitability, energy prices, project risk, regulations, and market sentiment. Therefore, ESG has a positive effect on firm value in Model 2, but the effect becomes weaker after ROA_w is included. Thus, H1c was accepted in Model 2, but the results need to be interpreted carefully because their significance does not persist after the mediating variables are included.

Financial Performance Mediation on ESG Performance and Firm Value

In the H1d hypothesis, financial performance is estimated to fully mediate the influence of ESG performance on firm value. To test this hypothesis, the study used two complementary approaches, namely the causal step mechanism according to Baron (1986) and bootstrap to assess the significance of the indirect effect.

Table 11. Bootstrap Mediation Test Results

No.	Models	Coefficients	*p-value*	Conclusion
1	ESG → ROA_w (path a)	0,0007	0,210	Insignificant
2	ESG → PBV (path c)	0,0116	0,096	Significant at 10%
3	ROA_w → PBV (path b)	0,7118	0,094	Significant at 10%
4	ESG → PBV after ROA_w is included (direct effect, path c')	0,0112	0,108	Insignificant
5	a × b: Indirect effect	0,0006	-0.0024682 to 0.0049243	Insignificant

Source: Processed from Stata19

Mediation testing using the Baron & Kenny (1986) framework showed that path a (ESG→ROA_w) was insignificant (coefficient 0.0007; p=0.210), path c (ESG→PBV) was significant at 10% (coefficient 0.0116), and path b (ROA_w→PBV) was significant at 10% (coefficient 0.7118), but path c' became insignificant after the mediator was inserted with a very small decrease in coefficients. The results of bootstrap 5,000 replications also confirmed that the indirect effect (a×b) was not significant with a 95% confidence interval that passed zero (-0.0025 to 0.0049), so the H1d hypothesis was rejected and financial performance was not proven to mediate the relationship between ESG and firm value (Alfons et al., 2022). This is likely due to three factors: the ESG benefits to profitability require a longer time horizon than the observation period; oil and gas firm value companies are more sensitive to external factors such as commodity prices, geopolitics, and energy transition expectations than annual profitability; and ESG investment in the oil and gas industry is perceived more as a long-term risk mitigation rather than a short-term profitability driver (Adiwardhana et al., 2025; Shah et al., 2022).

The Effect of Board Size on Firm Value

In the H2 hypothesis, board size is estimated to have a positive effect on firm value. In the two main models, the board size variable (LNBDSZ) had a coefficient of 0.6983 with a p-value of 0.002 in Model 2 and a coefficient of 0.7014 with a p-value of 0.002 in Model 3, thus having a positive and significant effect on PBV. These results show that the larger the size of the board, the more firm value tends to increase. H2 is therefore accepted.

These findings suggest that a larger board size can provide benefits to global oil and gas companies in the form of increased supervisory capacity, quality of strategic decisions, and diversity of expertise. Theoretically, Board Size can provide greater experience, skills, ideas, and access to resources and networks, supporting the company's oversight and value creation processes (Ben Fatma & Chouaibi, 2023). In the oil and gas industry which is very complex, high-risk, and heavily regulated, the need for a combination of expertise in operational, financial, governance, risk, safety, sustainability, and geopolitical aspects is becoming increasingly important (Shah et al., 2022). Therefore, positive and significant results can be interpreted as that a larger board provides added value for oil and gas companies in dealing with the complexity of their business.

The Influence of Board Independence on Firm Value

In the H3 hypothesis, board independence is estimated to have a negative effect on firm value. In the two main models, the KINDEP variable had a coefficient of -0.3787 with a p-value of

0.509 in Model 2 and a coefficient of -0.3978 with a p-value of 0.465 in Model 3, so that the direction of the relationship was indeed negative, but not statistically significant. Thus, H3 was rejected.

These results show that changes in the proportion of independent boards have not been shown to have an effect Firm Value global oil and gas company. While theoretically independent boards are expected to improve the quality of monitoring and reduce agency conflicts, empirical evidence also suggests that formal independence is not necessarily synonymous with substantive effectiveness in increasing firm value. Independent directors may lack industry-specific expertise in the technically complex oil and gas sector, and their monitoring capacity may be constrained when they serve on multiple boards or when dominant shareholders limit their influence on strategic decisions (Ben Fatma & Chouaibi, 2023). In some contexts, including in companies with strong ownership structures or certain governance characteristics, the effectiveness of independent boards can also be limited and may not always have a positive impact on the company's performance (Chaabouni et al., 2025).

In the oil and gas industry, strategic decisions are often influenced by more dominant factors such as shareholder structures, state interests, long-term projects, or global energy market conditions. As a result, the increase in the proportion of independent boards does not necessarily immediately translate into an increase in the value of the company.

The Influence of Busy Directors on Firm Value

In the H4 hypothesis, busy directors are estimated to have a positive effect on firm value. In the two main models, the BD variable had a coefficient of 0.0446 with a p-value of 0.729 in Model 2 and a coefficient of 0.0682 with a p-value of 0.622 in Model 3, so the direction of the relationship was positive but not significant. Therefore, H4 was rejected.

These findings indicate that the existence of a board that holds many positions outside the company does not significantly affect the value of global oil and gas companies. Conceptually, busy director can deliver benefits through broader experiences, stronger network access, and cross-company insights (Cooper & Uzun, 2022). Conversely, multiple directorships can reduce the focus, time commitment, and effectiveness of board supervision, particularly in an operationally complex sector such as oil and gas where board members must oversee safety, environmental compliance, and geopolitical risk. In the results of this study, the benefits and costs of busy directors appear to offset each other, producing a net insignificant relationship with firm value. This finding is consistent with the busyness hypothesis, which posits that the marginal cost of additional board appointments eventually exceeds the marginal benefit in terms of monitoring effectiveness.

The Influence of Board Diversity on Firm Value

In the H5 hypothesis, board diversity is estimated to have a positive effect on firm value. In the two main models, the BLAU variable has a coefficient of 0.5454 with a p-value of 0.328 in Model 2 and a coefficient of 0.5683 with a p-value of 0.328 in Model 3. Thus, the direction of the relationship is positive but not significant. Therefore, H5 was also rejected.

Firm value in the oil and gas industry is more influenced by fundamental industry factors, such as oil and gas prices, energy reserves, capital intensity, project risk, regulations, environmental risks, and energy transition pressures. Therefore, although Board Diversity can strengthen the strategic perspective and risk supervision, the effect of which is not necessarily directly reflected in the company's market value. In the context of the oil and gas industry, board gender diversity functions primarily as a supporting mechanism for risk oversight and ESG compliance rather than as a direct determinant of Firm Value (Shah et al., 2022; Shakil, 2021). In addition, the impact Board Diversity It also depends on the extent to which the diversity is substantive. If diverse board members do not have a real influence in strategic decision-making, then their existence is not strong enough to influence Firm Value. Chaabouni (2025) It also shows that women's participation in the board can have no significant effect on the company's performance if it is still symbolic or not fully empowered.

The Effect of Ownership Concentration on Firm Value

In the H6 hypothesis, ownership concentration is estimated to have a negative effect on

Firm Value. In the two main models, the OWNC variable has a coefficient of 0.8515 with p-value 0.164 on Model 2 and a coefficient of 0.8817 with p-value 0.164 on the Model 3, so it is not statistically significant. Furthermore, the direction of the coefficient is positive, contrary to the initial hypothesis. Therefore, H6 was rejected.

These results show that the concentration of ownership in global oil and gas companies has not been proven to reduce firm value. Theoretically, high ownership concentration can indeed pose a risk of expropriation for minority shareholders through tunneling, related-party transactions, or entrenchment, thus potentially depressing firm value. However, the literature also suggests that concentrated ownership in specific contexts can strengthen monitoring of management, reduce free-riding among dispersed shareholders, and support long-term strategic decision-making, particularly in capital-intensive industries that require patient capital and sustained investment horizons (Ben Fatma & Chouaibi, 2023).

In the oil and gas industry, large shareholders can function as more effective supervisors, provide discipline to management, and support a stable long-term investment strategy. This is especially relevant in sectors that require large investments, long-term strategic decisions, and high risk tolerance. Therefore, although the results of this study are not significant, the positive direction of the coefficient indicates that ownership concentration is not always perceived negatively by the market in the context of global oil and gas companies.

Robustness Test

Table 12. Robustness Test Results

Variable	US Koef. *(p-value)*			Non-US Koef. *(p-value)*		
	ROA_w	PBV	PBV Mediator ROA_w	ROA_w	PBV	PBV Mediator ROA_w
ESG	0,0031** (0,026)	0,0086 (0,468)	0,0119 (0,305)	-0,0020 (0,186)	0,0169 (0,191)	0,0259** (0,044)
ROA_w	-	-	-1,3914 (0,137)	-	-	4,5309*** (0,005)
LNBDSZ	-	0,6249 (0,472)	0,6229 (0,500)	-	0,2641 (0,631)	0,3868 (0,418)
KINDEP	-	-2,0502 (0,245)	-1,6921 (0,332)	-	0,4659 (0,628)	0,4274 (0,628)
BD	-	0,0443(0,904)	0,0162 (0,962)	-	-0,0697 (0,793)	0,0450 (0,856)
BLAU	-	0,1031 (0,956)	-0,0897 (0,964)	-	-0,0146 (0,986)	-0,2468 (0,768)
OWNC	-	2,9359* (0,088)	2,5281 (0,132)	-	-0,6165 (0,782)	-1,0013 (0,619)
FSZ	0,0833* (0,063)	-1,5482** (0,048)	-1,4352* (0,053)	0,0610 (0,120)	-1,7452** (0,015)	-2,0448*** (0,003)
FAGE	0,0616 (0,604)	-1,1862 (0,537)	-1,1656 (0,539)	-0,0236 (0,660)	0,3208 (0,640)	0,3887 (0,482)
LEV	-0,3553* (0,060)	2,4720* (0,073)	1,9004 (0,148)	-0,2575*** (0,004)	1,8517 (0,402)	2,9840 (0,127)
GDPGR	omitted	omitted	omitted	0,1019 (0,457)	4,2481 (0,145)	3,6380 (0,197)
R-squared	0,7649	0,5175	0,5285	0,6012	0,3818	0,4598
Prob > F	0,0000	0,0000	0,000	0,0000	0,0000	0,0000
N	105	105	105	165	165	165

Description: *p-value*; *p < 0.10, **p < 0.05, *** p < 0.01
Source: Processed from Stata19

Robustness tests by separating US and Non-US samples showed that most of the main results were not completely robust. In the financial performance model, ESG has a positive and significant effect on ROA in the US sample, but is not significant and tends to be negative in the

Non-US sample, indicating differences in the market context, regulation, and cost of ESG implementation between countries (Putra & Budastra, 2024; Shah et al., 2022; Shakil, 2021).

In relation to financial performance to firm value, profitability is more appreciated by the non-US market than by the US, because the value of oil and gas companies is not only determined by ROA, but also by commodity prices, energy reserves, geopolitical risks, and energy transition expectations. In the relationship between ESG and firm value, ESG was not significant in the US sample because it was likely to be compliance-based, while in the Non-US sample ESG had a positive and significant effect when ROA was included in the model, indicating that ESG was seen as more of a signal of legitimacy and risk management in the Non-US market (Aydoğmuş et al., 2022; Chen & Xie, 2022).

Financial performance has also not been proven to be a strong mediator, because the mediation pathway is not fully fulfilled in both sample groups, so ESG is more accurately understood to have a direct influence on firm value in the Non-US sample. In the governance variables, board size, board independence, busy director, and board diversity all had no significant effect after the sample was separated, possibly due to a reduction in the number of observations (Ben Fatma & Chouaibi, 2023). Meanwhile, ownership concentration showed only a positive marginal effect in unstable US samples after the mediator was inserted, and not significant at all in non-US samples

CONCLUSION

This study found that ESG performance has a positive but limited effect on the value of global oil and gas companies, and the effect is no longer significant after financial performance is incorporated into the model. Financial performance has not been shown to mediate the relationship between ESG and company value, although profitability remains an important signal for investors. In terms of governance, only board size has been proven to have a positive and significant effect on the company's value, while board independence, busy director, board diversity, and ownership concentration do not show a significant influence. Overall, the relationship between ESG, governance, and corporate value in the oil and gas industry is contextual, so companies need to integrate ESG substantively into their long-term business strategies, investors need to assess ESG more critically, and regulators need to encourage measurable and verifiable ESG disclosure.

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AUTHOR CONTRIBUTION STATEMENT

Agung Nurhananto Putro contributed to the conceptualization of the study, research design, data analysis using panel data regression, and manuscript drafting. Nur Dhani Hendranastiti contributed to methodological development, theoretical validation, and critical revision of the manuscript. All authors jointly participated in interpreting the results, refining the discussion, and approving the final version of the manuscript for submission and publication.

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