



ESG, Ownership Structure, and Firm Performance: Evidence From Indonesia

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Understanding how firms sustain performance under heightened uncertainty remains a prior issue in corporate finance, particularly in emerging markets characterized by institutional constraints. This study examines the effects of Environmental, Social, and Governance performance, ownership structure, and the COVID-19 crisis on firm performance in Indonesia. This study uses panel data of 39 ESG-committed listed firms over the period 2015–2024, the analysis applies static panel regression and dynamic Difference Generalized Method of Moments to address endogeneity and unobserved heterogeneity. This study shows that Environmental, Social, and Governance performance is positively associated with firm performance in Indonesia. The mean difference tests and scatter plot analysis indicate that firms with higher ESG engagement tend to exhibit higher return on assets and greater performance stability, particularly during the COVID-19 period. These patterns are confirmed by the dynamic GMM results, which reveal a positive and statistically significant effect of ESG performance on return on assets after accounting for endogeneity. The GMM estimates further show that liquidity and firm size positively influence asset-based profitability, while the COVID-19 shock exerts a negative effect on firm performance. Overall, the findings suggest that ESG integration enhances operational efficiency and functions as an effective risk-mitigation mechanism, underscoring the importance of embedding sustainability into core business strategies and strengthening ESG-related policy frameworks in emerging markets.

INTRODUCTION

The stability and sustainability of financial performance constitute the foundational pillars for corporate survival amidst an increasingly volatile global economy. Investors and strategic stakeholders rigorously evaluate a firm's capacity to generate operational profits and market value (Amarhyouz & Azegagh, 2025; Faruq *et al.*, 2023). Firm performance is not solely the product of managerial decisions taken in isolation; it is embedded within broader structural and institutional frameworks that influence strategic behavior, governance quality, and resource allocation (Attahiri & Zineelabidine, 2025). Contemporary financial literature posits that firm performance is not merely a static outcome of current decisions but is path-dependent, where past financial health significantly influences future trajectories. Consequently, understanding the multidimensional drivers of performance requires a rigorous examination of both internal governance mechanisms and external market pressures (Valencia, 2025).

A substantial body of empirical research emphasizes the importance of internal financial characteristics as key determinants of firm performance. Financial leverage and liquidity are critical determinants in this equation, as optimal capital structure decisions are essential for minimizing agency costs and maximizing shareholder wealth (Angsoyiri *et al.*, 2025). Firm size further differentiates performance outcomes, as larger firms often benefit from economies of scale, stronger bargaining power, diversified operations, and improved access to external financing, while smaller firms may face tighter financial constraints (Tinungki *et al.*, 2022). Nevertheless, empirical evidence on the performance implications of these financial characteristics remains mixed, with results varying across institutional contexts, industries, and time periods. Such inconsistencies suggest that financial factors alone do not fully explain firm performance dynamics and that their effects may be contingent on broader governance structures, market conditions, and external economic environments (Li *et al.*, 2024).

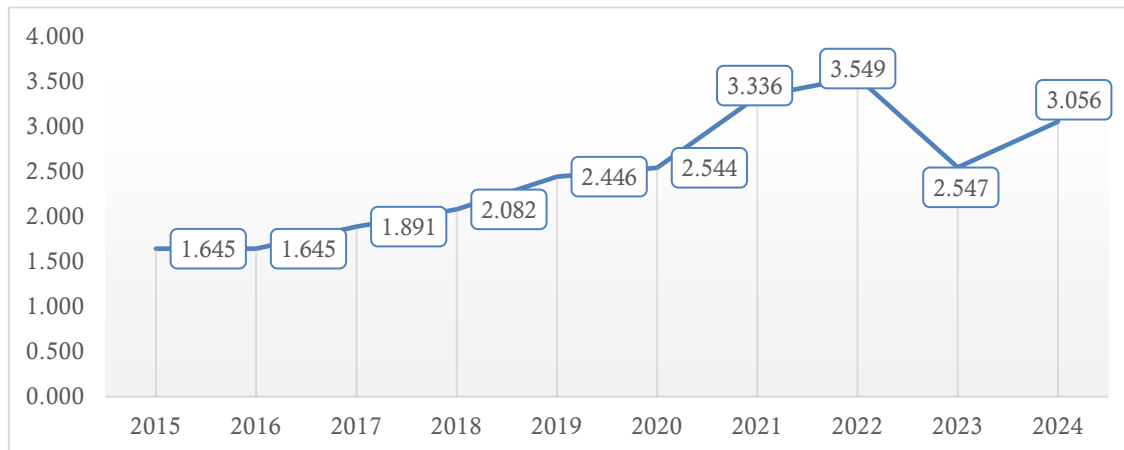


Figure 1. Trend in ESG Scores of KOMPAS100 Listed Firms

Source: Bloomberg Terminal (2025)

As illustrated in Figure 1, the ESG scores of firms listed in the KOMPAS100 Index display a sustained upward trend over the 2015–2024 period, albeit with temporary fluctuations. ESG performance remained relatively stable at 1.645 in 2015–2016, before increasing gradually to 1.891 in 2017 and 2.082 in 2018. The upward trajectory continued through 2019–2020, reaching 2.544, and peaked during the post-

pandemic recovery phase in 2021 and 2022 at 3.336 and 3.549, respectively. Although a decline occurred in 2023, followed by a rebound in 2024, the overall pattern indicates a strengthening long-term commitment to sustainability practices. However, this progressive increase in ESG engagement does not consistently align with improvements in return on assets (ROA), particularly during and after the COVID-19

period. The divergence between the upward ESG trend and fluctuating asset-based profitability suggests that the ESG–performance relationship may be dynamic rather than contemporaneous. This empirical pattern motivates a deeper

investigation into whether ESG performance enhances operational profitability once persistence effects and structural shocks are properly accounted for.

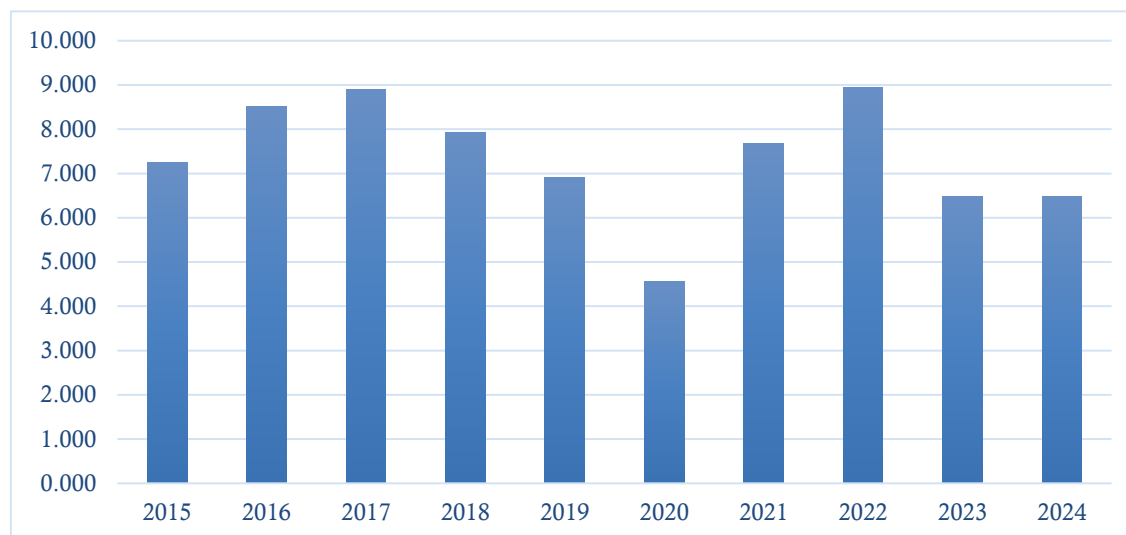


Figure 2. Average Return on Assets (ROA) of KOMPAS100 Index Listed Firms.

Source: Bloomberg Terminal (2025)

Figure 2 shows that the average Return on Assets (ROA) of KOMPAS100 firms exhibits significant fluctuations over the 2015–2024 period rather than a stable upward trend. ROA increased until 2017, declined gradually before experiencing a sharp contraction in 2020 due to the COVID-19 shock, rebounded strongly in 2021–2022, and weakened again in 2023–2024. This pronounced volatility indicates that asset-based profitability remains vulnerable to external disruptions and structural adjustments. The unstable trajectory of ROA raises a critical question regarding whether ESG engagement contributes to enhancing performance resilience and reducing profitability volatility over time, thereby justifying a dynamic empirical investigation.

Corporate evaluation paradigms have fundamentally shifted from a singular focus on shareholder primacy toward a broader stakeholder-oriented approach that integrates Environmental, Social, and Governance (ESG) criteria (Yahya, 2023). The integration of ESG into business strategy is increasingly viewed as a mechanism to reduce information asymmetry,

enhance corporate legitimacy, and mitigate long-term risks (Martiny et al., 2024). Empirical evidence regarding the ESG–financial performance nexus remains heterogeneous; while some studies suggest that robust ESG disclosure enhances firm value by signaling sustainability to investors (Elamer, 2024; Giordino et al., 2025), others argue that the high costs associated with ESG implementation may erode short-term profitability in emerging markets (Che et al., 2024). This divergence underscores the necessity of analyzing ESG not as a monolithic entity but as a complex variable that interacts dynamically with firm-specific characteristics and broader institutional contexts.

The relationship between governance mechanisms and firm performance is significantly modulated by ownership structure, particularly in emerging economies characterized by a high concentration of state ownership. Ownership structure serves as a critical governance mechanism that influences monitoring quality and managerial incentives (Alshareef, 2024). In the context of Asian markets, State-Owned Enterprises (SOEs) often

operate under dual mandates—pursuing commercial viability while fulfilling sociopolitical objectives which creates a distinct operational environment compared to Privately-Owned Enterprises (POEs) (Zhu et al., 2025). Ownership structure represents a critical governance mechanism influencing firm performance in Indonesia, where state-owned enterprises (BUMN) coexist with privately owned firms within the capital market under distinct institutional and regulatory environments. Previous research found that while SOEs may benefit from government support and resource access, they often face efficiency challenges due to agency conflicts and bureaucratic interventions, whereas private firms typically exhibit greater responsiveness to market signals and innovation pressures (Angsoyiri et al., 2025; Yuan et al., 2023). Understanding these structural differences is vital for disentangling the specific effects of governance on financial outcomes.

The global economic landscape was profoundly disrupted by the COVID-19 pandemic, which functioned as a severe exogenous shock testing the resilience of corporate financial architectures. This crisis transcended typical market fluctuations, causing structural breaks in demand and supply chains that severely impacted corporate profitability and liquidity across various sectors (Qadri et al., 2023). Firms were forced to navigate unprecedented uncertainty, where traditional financial strategies often proved insufficient. Emerging evidence suggests that companies with robust governance frameworks and sustainable practices demonstrated superior resilience during this turbulent period, effectively using ESG performance as a buffer against market volatility (Tinungki et al., 2022). Analyzing firm performance through the lens of this crisis provides a unique opportunity to evaluate the true depth of corporate resilience and the protective value of sustainability initiatives.

Despite the proliferation of studies on corporate governance and performance, significant gaps remain regarding the dynamic

interplay between ESG, ownership structure, and financial outcomes in emerging markets like Indonesia. Most extant literature relies on static estimation methods that fail to account for the persistence of financial performance and the endogeneity inherent in corporate governance variables (Alshareef, 2024; Jiang & Vitenu-sackey, 2025). Furthermore, the specific interaction between ownership structure and ESG performance during crisis periods remains underexplored. This study addresses these lacunae by employing a dynamic panel data approach to provide robust empirical evidence from the Indonesian context. The primary objective is to rigorously analyze how ESG performance and ownership structure influence financial performance, while simultaneously evaluating the structural impact of the pandemic shock on these relationships.

RESEARCH METHODS

This study examines the impact of governance quality indicators on firm performance in Indonesia using a quantitative approach. The analysis employs secondary data obtained from Bloomberg and audited financial statements of listed firms over the period 2015–2024. Firm performance is proxied by return on assets (ROA), which captures firms' operational efficiency in utilizing their asset base.

The study empirically investigates the role of Environmental, Social, and Governance (ESG) engagement in shaping corporate performance within the Indonesian context, while controlling for ownership structure—state-owned enterprises (SOEs) and privately owned enterprises (POEs)—and the COVID-19 pandemic through dummy variables. These controls are incorporated to account for institutional heterogeneity and exogenous shocks that may systematically affect firm performance. In addition, the empirical model includes firm-specific control variables, namely leverage, liquidity, and firm size. Table 1 summarizes the definitions and measurements of all variables used in this study.

Table 1. Variable descriptions

Variable	Description	Unit	Source
Return on Assets (ROA)	A measure of operational efficiency capturing the firm's ability to generate earnings from its total asset base, indicating the effectiveness of asset utilization.	Percentage (%)	Financial Report
Leverage (LEV)	A financial risk indicator representing the extent to which a firm's assets are financed through debt, commonly measured as the ratio of total debt to total assets.	Ratio	Financial Report
Liquidity (LIQ)	A short-term solvency measure reflecting the firm's capacity to meet current obligations, typically proxied by the current ratio.	Ratio	Financial Report
Firm Size (SIZE)	A scale variable representing the magnitude of firm operations, proxied by the natural logarithm of total assets.	Natural logarithm	Financial Report
Environmental, Social, and Governance Score (ESG)	A composite index capturing the firm's sustainability performance and commitment to environmental stewardship, social responsibility, and sound governance practices.	Index	Bloomberg
COVID-19 Period (COV)	A binary variable indicating the period affected by the COVID-19 pandemic (1 = COVID-19 period; 0 = non-pandemic period).	Dummy	Authors classification
Ownership Structure (BUMN)	A binary indicator identifying firm ownership type (1 = Private-Owned company; 0 = State-owned company).	Dummy	Financial Report

Source: Author analysis, 2026

The data analysis method employed in this study is multiple regression analysis. According to (Gujarati et al., 2010), multiple regression is a statistical technique used to evaluate the relationship between a single dependent variable and two or more independent variables simultaneously. This approach is particularly appropriate when the number of explanatory variables included in the statistical model exceeds one. Within the multiple regression framework, the estimation is conducted using the Ordinary Least Squares (OLS) method, whose primary objective is to estimate the regression line by minimizing the sum of squared residuals for each observation (Studentmund, 2016). The econometric specification adopted in this study follows the multiple regression model developed can be expressed as follows:

$$Y_{it} = \alpha_{it} + \beta_{it}X_{it} + \mu_{it} \dots\dots\dots(1)$$

where Y_{it} represents the observation of the i -th cross-sectional unit in period t ; α_{it} denotes the intercept term for unit i at time t ; β_{it} refers to the coefficient vector associated with the independent variables observed for unit i in period t ; X_{it} denotes the vector of explanatory variables; and μ_{it} is the stochastic error term for unit i in period t .

Firm performance is measured return on asset (ROA). Hence, the equation of panel regression could be written as a follows:

$$ROA_{it} = \alpha + \beta_1LEV_{it} + \beta_2LIQ_{it} + \beta_3SIZE_{it} + \beta_4ESG_{it} + \beta_5COV_{it} + \beta_6BUMN_{it} + \varepsilon_{it} \dots(2)$$

Where ROA, serve as proxies for company performance; LEV denotes leverage; LIQ represents liquidity; SIZE refers to firm size; ESG indicates the firm's ESG score; COV is a pandemic dummy variable (1 = COVID-19 period; 0 = non-pandemic period); OWN is an ownership structure dummy (1 = state-owned

enterprise; 0 = privately owned firm); α represents the constant term; β_1 – β_8 are the regression coefficients capturing the marginal effects of the respective explanatory variables; i denotes the i -th cross-sectional unit, t refers to the time period, and ε is the stochastic error term.

Furthermore, this study employs a dynamic panel data approach using the Generalized Method of Moments (GMM) to obtain robust and empirically reliable estimates while addressing endogeneity, unobserved heterogeneity, and dynamic persistence (Wooldridge, 2010). Arellano & Bond, (1991) develop a dynamic panel estimator using the Generalized Method of Moments (GMM) that exploits lagged levels of the endogenous variables as instruments to address unobserved heterogeneity and endogeneity in panel data estimation (Baltagi, 2005). A growing body of empirical literature applies the Generalized Method of Moments (GMM) to company performance research, primarily due to its ability to control for endogeneity, unobserved heterogeneity, and dynamic adjustment effects inherent in panel data (Amarhyouz & Azegagh, 2025; Cangombe & Almeida, 2025; Faruq et al., 2023; Tinungki et al., 2022). The inclusion of lagged dependent terms allows the model to capture adjustment dynamics and path dependency over time, while internal instruments constructed from lagged values ensure consistency in the presence of simultaneity and heteroskedasticity. Hence, the GMM equation could be written as a follows:

$$\begin{aligned} ROA_{it} = & \alpha + ROA_{it-1} + \beta_1 LEV_{it} + \beta_2 LIQ_{it} + \\ & \beta_3 SIZE_{it} + \beta_4 ESG_{it} + \beta_5 COV_{it} + \\ & \beta_6 BUMN_{it} + \varepsilon_{it} \dots\dots\dots(3) \end{aligned}$$

The validity of the instrument set is assessed using the Hansen test of overidentifying restrictions, which evaluates whether the

instruments are exogenous and appropriately specified. In addition, model consistency is examined through serial correlation tests, specifically the Arellano–Bond tests for first-order and second-order autocorrelation, where the absence of AR(2) in differenced residuals indicates correct model specification (Arellano & Bond, 2012).

RESULTS AND DISCUSSION

Table 2 shows that firm performance among Indonesian listed firms exhibits substantial variation, as reflected by the distribution of return on assets (ROA). The average ROA is 7.36, indicating moderate asset-based profitability, while the wide range of values suggests considerable heterogeneity in firms' ability to generate operating returns from their asset base. This dispersion highlights differences in operational efficiency across firms within the sample. Table 2 also reports notable variation in firm-specific characteristics. Leverage averages 1.16, reflecting a moderate reliance on debt financing, while liquidity records a mean value of 2.32, indicating generally adequate short-term financial capacity among firms. Firm size appears relatively stable across the sample, suggesting limited scale dispersion among listed firms included in the analysis. ESG scores average 2.47, indicating a moderate level of sustainability engagement with substantial variation across firms. In addition, the balanced distribution of the COVID-19 dummy and the predominance of state-owned enterprises underscore the relevance of external shocks and ownership structure in shaping firm performance dynamics. Overall, the descriptive statistics confirm sufficient cross-sectional and temporal variation across variables, supporting their suitability for panel data econometric analysis.

Table 2. Descriptive Statistics

	ROA	LEV	LIQ	SIZE	ESG	COV	BUMN
Mean	7.3620	1.1598	2.3171	17.4786	2.4741	0.5000	0.6923
Median	5.7650	0.8200	1.8400	17.4700	2.5900	0.5000	1.0000
Maximum	55.7300	13.5400	12.7300	19.9700	5.9200	1.0000	1.0000
Minimum	-6.7500	0.0900	0.2100	15.0000	0.0000	0.0000	0.0000
Std. Dev.	7.1243	1.3205	1.6620	0.9745	1.5171	0.5006	0.4621
Skewness	1.8457	4.9479	2.1399	-0.1043	-0.0214	0.0000	-0.8333
Kurtosis	9.7572	41.3825	9.8158	2.9335	2.1154	1.0000	1.6944
Observations	390	390	390	390	390	390	390

Source: Data processed, 2026

Table 3 presents the results of the mean difference tests across ownership structures, highlighting statistically significant differences between state-owned enterprises (SOEs) and privately owned enterprises (POEs). The t-test results indicate that POEs exhibit significantly higher return on assets (ROA) than SOEs at the 5% significance level, suggesting superior asset-based profitability among privately owned firms. This finding implies that POEs are more efficient in utilizing their asset base to generate operating profits, potentially reflecting stronger market discipline and managerial incentives. Significant differences are also observed in firm size and ESG engagement. SOEs are significantly larger than POEs, consistent with their dominant role

in strategic and capital-intensive sectors of the Indonesian economy. Moreover, SOEs record significantly higher ESG scores at the 1% level, indicating a stronger formal commitment to sustainability practices, likely driven by regulatory mandates and public accountability pressures. In contrast, no statistically significant differences are found in leverage and liquidity between the two ownership groups, suggesting that capital structure and short-term financial capacity do not differ systematically between SOEs and POEs. Overall, the mean difference results confirm that ownership structure is associated with meaningful differences in both operational performance and strategic orientation toward sustainability.

Table 3. Descriptive Statistics and Mean Difference Tests by Ownership Structure

Variable	Private-Owned Company					State-Owned Company (BUMN)					T-stat
	Obs	Mean	Std.dev	Min	Max	Obs	Mean	Std.dev	Min	Max	
ROA	310	7.746	7.281	-6.750	55.730	80	5.875	6.305	-5.500	30.850	2.103**
LEV	310	1.123	1.411	0.090	13.540	80	1.303	0.879	0.370	3.310	1.090
LIQ	310	2.534	1.775	0.210	12.730	80	1.476	0.613	0.280	2.660	0.245
SIZE	310	17.394	0.982	15.000	19.970	80	17.807	0.876	16.040	19.520	3.430***
ESG	310	2.277	1.415	0.000	5.450	80	3.240	1.661	0.000	5.920	5.233***

Note: *, **, and *** are significant at 10%, 5% and 1%

Source: Data Processed, 2026

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that capital structure and short-term financial capacity do not differ systematically between SOEs and POEs. Overall, the mean difference results confirm that ownership structure is associated with meaningful differences in both operational performance and strategic orientation toward sustainability.

Table 4. Descriptive Statistics and Mean Difference Tests by COVID-19

Variable	COVID-19 pandemic period					Non-pandemic period					T-stat
	Obs	Mean	Std.dev	Min	Max	Obs	Mean	Std.dev	Min	Max	
ROA	117	6,834	6,708	-4,100	55,730	273	7,896	7,426	-6,750	32,710	1,467*
LEV	117	1,087	0,720	0,090	5,150	273	1,223	1,615	0,130	13,540	1,022
LIQ	117	2,282	1,855	0,210	8,170	273	2,342	1,786	0,280	12,730	0,364
SIZE	117	17,680	0,851	15,670	19,970	273	17,261	0,994	15,000	19,680	0,345
ESG	117	3,006	1,377	0,000	5,490	273	1,933	1,325	0,000	5,920	7,182***

Note: *, **, and *** are significant at 10%, 5% and 1%

Table 4 presents the results of the mean difference tests between the COVID-19 pandemic period and the non-pandemic period, highlighting statistically significant differences in firm performance and ESG engagement. The t-test results indicate that return on assets (ROA) is significantly lower during the COVID-19 pandemic period at the 10% significance level, suggesting a deterioration in firms' operational performance following the pandemic shock. This finding reflects the adverse impact of disruptions in production activities, demand contraction, and supply chain instability on firms' ability to generate profits from their asset base. In contrast, ESG scores are significantly higher during the pandemic period at the 1% significance level, indicating that firms intensified their sustainability and governance practices amid heightened uncertainty and stakeholder scrutiny. This increase suggests that ESG engagement may have functioned as a strategic response to crisis conditions, aimed at strengthening legitimacy and resilience. Meanwhile, the mean differences in leverage, liquidity, and firm size across the two periods are statistically insignificant, implying that the COVID-19 shock primarily affected firms' operational performance and strategic orientation toward sustainability rather than their underlying financial structure. Overall, the mean difference results confirm that the pandemic constituted a significant external shock to firm

performance, while simultaneously accelerating firms' ESG engagement.

To provide a more comprehensive depiction of the relationship between ESG performance and firm profitability, this study employs scatter plots to visualize the association between ESG scores and return on assets (ROA) across ownership structures—state-owned enterprises (SOEs) and privately owned enterprises (POEs)—during the COVID-19 pandemic and the non-pandemic period. Figure 1 illustrates the distribution and interaction patterns between ESG engagement and asset-based performance under different economic conditions.

The scatter plots show pronounced differences in the dispersion and clustering of ESG–ROA relationships across ownership structures and economic conditions. During the non-pandemic period, privately owned enterprises (POEs) display a widely dispersed pattern, characterized by substantial variation in ROA across different ESG levels. This wide horizontal and vertical spread suggests a weak and inconsistent association between ESG engagement and asset-based profitability under stable macroeconomic conditions, indicating that high operational returns among POEs are not systematically aligned with stronger ESG performance. In contrast, state-owned enterprises (SOEs) exhibit a more compact distribution, with

observations clustering around moderate-to-high ESG scores and relatively stable ROA levels, reflecting a more standardized ESG orientation that is less sensitive to short-term profitability fluctuations.

During the COVID-19 pandemic period, the overall dispersion narrows for both ownership groups, and the ESG–ROA relationship becomes visually more structured. Firms with higher ESG scores tend to cluster at relatively higher ROA levels, suggesting a strengthening positive association between sustainability engagement and operational

performance under crisis conditions. This pattern is particularly evident among SOEs, where observations concentrate within a narrower ROA range at medium-to-high ESG levels, indicating greater performance stability. Among POEs, although ROA dispersion remains broader, firms with higher ESG scores appear less exposed to severe profitability declines. Collectively, these distributional patterns suggest that ESG practices play a stabilizing role in asset-based performance, becoming more economically relevant during periods of heightened external stress.

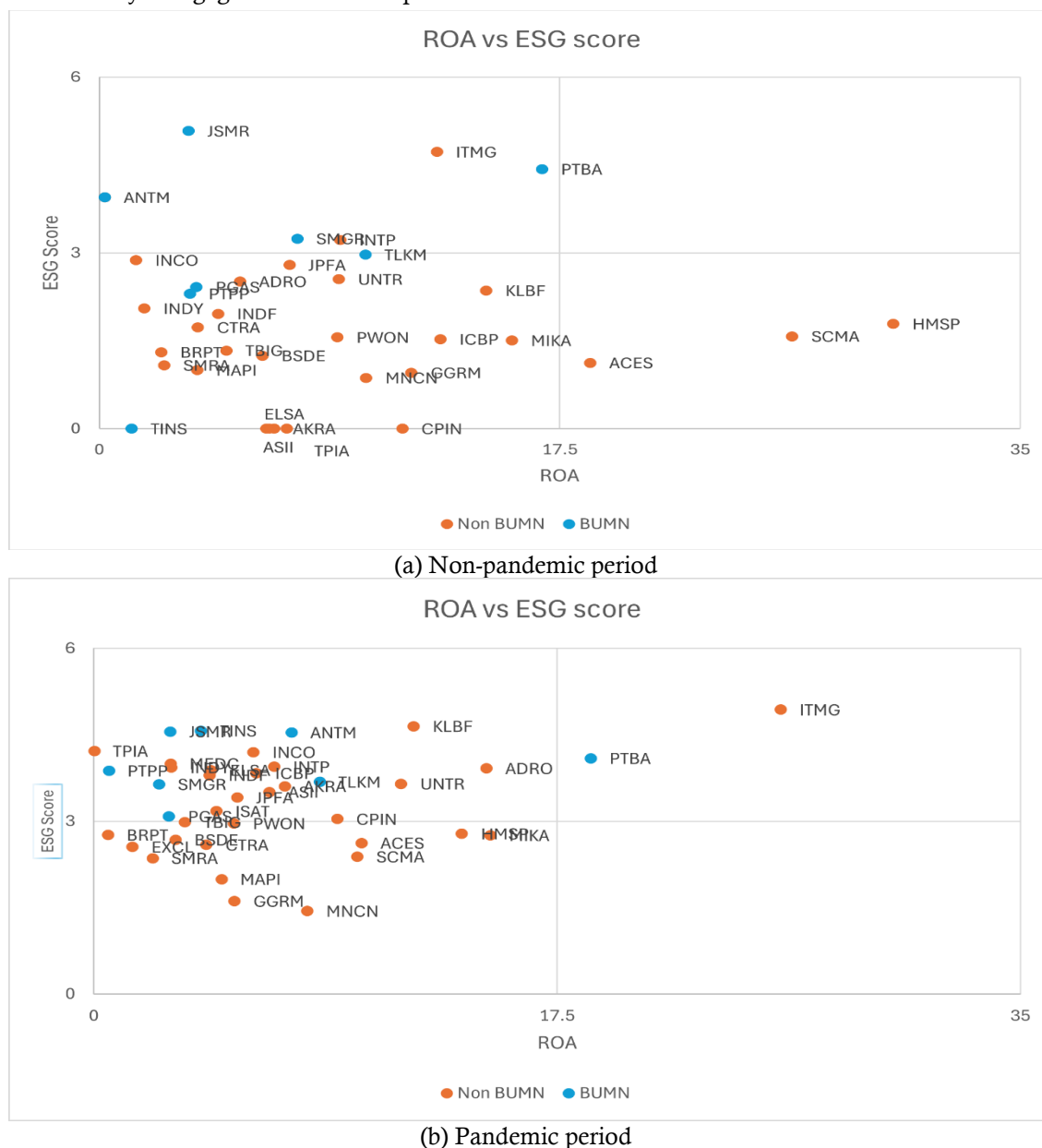


Figure 1. Scatter Plot of ESG and Return on Assets across SOEs and POEs under Pandemic and Non-Pandemic Period

Table 5 shows that the magnitude of all pairwise correlation coefficients remain well below the conventional multicollinearity threshold of 0.80, indicating that there is no serious multicollinearity problem among the

explanatory variables. This finding suggests that the estimated regression coefficients are unlikely to be distorted by strong linear dependence, thus supporting the robustness and reliability of subsequent panel data econometric results

Table 5. Correlation Matrix

	ROA	LEV	LIQ	SIZE	ESG	COV	BUMN
ROA	1.0000						
LEV	-0.1791	1.0000					
LIQ	0.2618	-0.4471	1.0000				
SIZE	-0.2755	0.1078	-0.4220	1.0000			
ESG	0.1104	0.0486	-0.0679	0.2039	1.0000		
COV	-0.0813	-0.0336	-0.0186	0.2108	0.3500	1.0000	
BUMN	0.0230	0.0195	-0.0165	-0.0795	-0.2481	-0.4108	1.0000

Source: Data processed, 2026

Table 6 presents the fixed effects panel regression results estimating firm performance as measured by return on assets for Indonesian listed companies. The choice of the fixed effects model is supported by the panel specification tests. The Chow test statistic is 16.411 with probability value of 0.0000, indicating statistically significant firm-specific heterogeneity and leading to the rejection of the pooled ordinary least squares model. This result confirms that firm-level effects are relevant in explaining variations in return on assets. Furthermore, the Hausman test statistic equals 31.804 with probability value of 0.0000, indicating that unobserved firm-specific effects are correlated with the explanatory variables. Taken together, these test results confirm that the fixed effects estimator is the most appropriate and consistent specification for the data.

The regression results indicate that leverage has a negative and statistically significant effect on return on assets, with a coefficient of -0.434 and a probability value of 0.0329, showing that higher debt intensity reduces firms' asset-based profitability. Liquidity exhibits a positive and statistically significant effect, with a coefficient of 0.663 and a probability value of 0.0302, suggesting that firms with stronger short-term financial capacity are better able to generate operating returns from their asset base. Firm size shows a negative coefficient of -0.607 but is statistically

insignificant, with a probability value of 0.2984, indicating that scale effects do not play a decisive role in explaining return on assets once firm-specific characteristics are controlled for. ESG performance displays a coefficient of -0.006 and is statistically insignificant, with a probability value of 0.9585, implying that sustainability engagement does not exert an immediate impact on contemporaneous accounting profitability in the static specification. The ownership structure variable exhibits a negative coefficient of -0.453 and is weakly significant at the ten percent level, with a probability value of 0.0848, suggesting that state-owned enterprises tend to generate lower asset-based returns relative to privately owned firms. The COVID-19 variable has a negative and statistically significant coefficient of -0.887 with a probability value of 0.0095, confirming that the pandemic constituted a severe external shock that substantially weakened firms' operational performance.

The fixed effects model exhibits strong explanatory power, as indicated by an adjusted R-squared value of 0.745, showing that a substantial proportion of the variation in return on assets is explained by the included explanatory variables. The overall significance of the model is confirmed by an F-statistic of 26.892 with a probability value of 0.0000, indicating that the regressors are jointly significant in explaining firm performance. The diagnostic tests indicate that the classical regression assumptions are

satisfactorily met. The Jarque–Bera test does not indicate serious departures from normality, suggesting that the residuals are approximately normally distributed. The Glejser test yields a probability value of 0.208, indicating the absence of heteroskedasticity. In addition, the Pesaran

cross-sectional dependence test does not reveal significant cross-sectional correlation among firms. Collectively, these results confirm that the fixed effects model is well specified and that the estimated coefficients are statistically reliable

Table 6. Panel Regression Estimation Result

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	18,844	9,987	1,887	0,0600
LEV	-0,434	0,203	-2,142	0,0329**
LIQ	0,663	0,305	2,177	0,0302**
SIZE	-0,607	0,583	-1,042	0,2984
ESG	-0,006	0,115	-0,052	0,9585
COV	-0,887	0,340	-2,608	0,0095***
BUMN	-0,453	0,262	-1,729	0,0848*
R-squared	0,774	F-statistic		26,892
Adjusted R-squared	0,745	Prob(F-statistic)		0,000
Chow-Test	16.411***	Jarque-bera prob.		-1.256
Hausman-Test	31.804***	Glesjer test		0.208
Observation	390	CD Pesaran		-1.256

Note: *, **, and *** are significant at 10%, 5% and 1%

Source: Data Processed, 2026

Table 7 reports the results of the dynamic panel regression estimated using the Difference Generalized Method of Moments, with firm performance measured by return on assets. The inclusion of the lagged dependent variable allows the model to capture performance persistence and dynamic adjustment behavior in firm profitability. The coefficient of lagged return on assets is positive and highly significant, with a value of 0.334 and a probability value of 0.0000, indicating strong persistence in asset-based profitability. This result confirms that current firm performance is systematically influenced by past performance, validating the use of a dynamic specification over a static panel model.

The dynamic estimation reveals several robust and economically meaningful relationships. Liquidity exhibits a positive and statistically significant coefficient of 3.313 with a probability value of 0.0000, indicating that firms with stronger short-term financial capacity are able to substantially enhance their operational performance when dynamic effects are accounted for. Firm size also shows a positive and statistically significant effect on return on

assets, with a coefficient of 3.947 and a probability value of 0.0019, suggesting that scale advantages and access to resources improve asset utilization over time. ESG performance displays a strong positive and statistically significant coefficient of 2.733 with a probability value of 0.0000, indicating that sustainability engagement contributes positively to firms' operational profitability once endogeneity and dynamic adjustments are properly controlled for. In contrast, leverage is not statistically significant, with a coefficient of -0.751 and a probability value of 0.1492, suggesting that the adverse effects of debt on profitability observed in the static model weaken after accounting for dynamic behavior. The COVID-19 variable exhibits a large negative and statistically significant coefficient of -2.544 with a probability value of 0.0000, confirming that the pandemic constituted a severe external shock that substantially reduced firms' asset-based profitability. The ownership structure variable shows a positive and statistically significant coefficient of 1.058 with a probability value of 0.0113, indicating that state-owned enterprises

tend to exhibit higher return on assets relative to privately owned firms when dynamic adjustments and unobserved heterogeneity are taken into account. This result suggests that

institutional support and access to government-linked resources enhance operational resilience in a dynamic setting.

Table 7. Dynamic Panel Regression Estimation Result

Variables	Coefficient	Std. Error	t-Statistics	Prob.
ROA(-1)	0,334	0,033	10,181	0,0000***
LEV	-0,751	0,520	-1,446	0,1492
LIQ	3,313	0,552	6,000	0,0000***
SIZE	3,947	1,262	3,127	0,0019***
ESG	2,733	0,295	9,275	0,0000***
COV	-2,544	0,327	-7,768	0,0000***
BUMN	1,058	0,415	2,547	0,0113**
J-statistic	27,899	Instrument rank		36
Prob(J-statistic)	0,523	Observation		312
Prob AR (1)	-4.176***			
Prob AR (2)	-1.064			

Note: *, **, and *** are significant at 10%, 5% and 1%

Source: Data Processed, 2026

The result validates the use of a dynamic panel approach over the fixed effects model, as static specifications are unable to capture the adjustment processes and inertia inherent in firms' asset-based performance dynamics. Consistent with Alshareef (2024), who argues that dynamic estimators are essential in emerging markets to control for endogeneity and unobserved heterogeneity, our findings suggest that past profitability provides the necessary slack resources for future reinvestment, creating a cycle of cumulative advantage. Furthermore, this persistence aligns with the Resource-Based View (RBV), suggesting that internal capabilities developed over time create barriers to imitation that sustain performance, a phenomenon also observed in recent studies on corporate financial sustainability.

Regarding firm-specific financial characteristics, this study reveals a nuanced landscape in which financial architecture shapes asset-based performance outcomes. The dynamic specification shows that financial leverage does not exert a statistically significant effect on return on assets, suggesting that debt financing does not immediately undermine firms' operational efficiency once performance persistence and dynamic adjustments are accounted for. This

finding indicates that the adverse implications of leverage for firm performance may materialize gradually rather than contemporaneously, consistent with Dam et al., (2024) who argue that excessive leverage constrains financial flexibility and amplifies agency-related risks in emerging markets. In contrast, liquidity exhibits a positive association with return on assets, indicating that firms with stronger short-term financial capacity are better positioned to sustain operations and optimize asset utilization, particularly during periods of heightened uncertainty such as the COVID-19 pandemic. However, as noted by (Fareed, 2025), excessive liquidity may also reflect idle capital, suggesting that its positive effect on operational performance depends on effective deployment rather than mere accumulation. Furthermore, firm size positively influences return on assets in the dynamic setting, confirming the presence of economies of scale and superior resource access that enhance operational efficiency Jiang & Vitenu-sackey (2025). At the same time, as highlighted by Glova, (2025) larger organizational structures may introduce rigidities that temper performance gains, implying that the benefits of scale for asset-based profitability are conditional on firms'

ability to manage complexity and sustain operational flexibility.

This study finds a positive and statistically significant impact of ESG performance on firm performance, as measured by return on assets, under the dynamic GMM specification. This result contrasts with the traditional trade-off perspective, which views ESG engagement primarily as a costly compliance activity that may erode short-term profitability. Instead, the findings align with stakeholder and signaling theories, which argue that ESG initiatives reduce information asymmetry, enhance stakeholder trust, and strengthen long-term operational efficiency. Li *et al.*, (2024) provide an economic mechanism supporting this interpretation, demonstrating that superior ESG performance alleviates financing constraints and improves total factor productivity by signaling credibility to creditors and investors. Furthermore, Vijayappan & Biju (2025) suggest that in emerging markets, ESG performance reflects managerial quality and strategic discipline, which gradually materialize in improved accounting profitability. Our results are consistent with this stream of literature, indicating that ESG engagement enhances asset utilization efficiency once dynamic adjustments and endogeneity are properly controlled.

However, the finding also departs from several empirical studies that report insignificant or negative ESG–performance relationships in emerging markets, often attributed to high implementation costs, symbolic compliance, or weak institutional enforcement. The discrepancy may stem from methodological differences. Static panel models frequently fail to capture performance persistence and may underestimate the intertemporal benefits of ESG investments. By employing a dynamic GMM framework, this study demonstrates that the economic value of ESG becomes visible once past profitability, adjustment processes, and endogeneity are incorporated into the estimation. In the Indonesian context, characterized by concentrated ownership and evolving regulatory standards, sustained ESG engagement appears to strengthen corporate legitimacy and operational

resilience, which, as emphasized by Lunawat & Elmarzouky (2025), is more accurately reflected in long-term profitability dynamics rather than contemporaneous short-term measures. Therefore, the positive ESG effect observed in this study should be interpreted not merely as a correlation, but as evidence that sustainability integration contributes to cumulative operational advantages over time.

Furthermore, this study provides nuanced evidence regarding the role of ownership structure, operationalized through a dummy variable distinguishing state-owned enterprises (SOEs) from privately owned enterprises (POEs). The positive and statistically significant coefficient of the ownership variable in the dynamic specification indicates that SOEs exhibit higher asset-based profitability than POEs. This result can be interpreted through the lens of Resource Dependence Theory. As noted by Faruq *et al.*, (2023), SOEs in emerging Asian markets often benefit from preferential access to government-linked resources, subsidies, and state-backed financing, which enhance operational stability and reduce financing constraints. In the Indonesian context, this institutional support enables SOEs to maintain relatively stable operational performance even during periods of economic stress. However, Angsoyiri *et al.*, (2025) caution that state ownership may also introduce governance inefficiencies arising from bureaucratic intervention or the pursuit of non-commercial objectives. Consequently, while SOE status confers advantages in sustaining asset-based profitability, it does not necessarily imply superior market discipline or strategic flexibility relative to POEs, which are typically driven by stronger profit-maximization incentives but lack comparable institutional support.

The consistently negative and statistically significant coefficient of the COVID-19 dummy variable across the estimated models confirms that the pandemic constituted a severe exogenous shock that generated a structural break in firms' operational performance. This finding is consistent with Qadri *et al.*, (2023) who document substantial declines in profitability and

liquidity across sectors due to supply chain disruptions and demand contraction during the health crisis. However, when examined alongside the ESG results, a more nuanced insight emerges. Firms with stronger ESG engagement appear better positioned to withstand the adverse effects of the pandemic, as reflected in their relatively more stable asset-based profitability. As emphasized by Elamer (2024), ESG practices act as a mechanism for corporate resilience, providing a "social license to operate" and maintaining stakeholder trust during crises. The negative coefficient of the COVID-19 dummy signifies the magnitude of the crisis, but the positive ESG coefficient in the GMM model implies that sustainability investments provided a necessary buffer, mitigating the depth of the performance decline compared to firms with weaker governance and social capital.

Collectively, these findings carry important managerial implications for the Indonesian corporate sector, particularly in reconciling regulatory compliance with strategic value creation. The robust positive relationship between ESG performance and return on assets under the dynamic framework suggests that sustainability initiatives should not be treated as a procedural or symbolic exercise, but rather as an integral component of firms' operational strategies. Consistent with stakeholder theory, the integration of ESG practices enhances firms' ability to manage relationships with key stakeholders, reduce operational frictions, and sustain productive capabilities over time. At the same time, signaling theory provides a complementary explanation, as sustained ESG engagement conveys credible information regarding management quality and long-term strategic orientation to external investors. As argued by Che *et al.*, (2024) such signals improve firms' perceived viability and reinforce confidence in their capacity to generate stable operating returns, particularly in environments characterized by institutional uncertainty.

Furthermore, the findings offer nuanced insights into the strategic positioning of state-owned enterprises within Indonesia's institutional framework. The relatively strong operational performance observed among SOEs reflects the advantages of institutional support, including preferential access to resources and state-backed financing, which aligns with resource dependence theory. However, the absence of a corresponding market premium highlights persistent agency concerns associated with state ownership, as noted by Zhu *et al.*, (2025) where political objectives and bureaucratic intervention may dilute performance incentives and transparency. Importantly, the superior resilience of firms with high ESG engagement during the COVID-19 shock underscores the role of sustainability frameworks as an effective risk management mechanism. By embedding ESG principles into core operational processes, firms are better equipped to absorb external shocks and preserve asset-based profitability. In Indonesia's distinctive institutional setting, the alignment of operational objectives with sustainable governance practices is therefore not merely complementary but essential for sustaining competitive advantage and navigating increasing scrutiny from regulators, investors, and broader stakeholders.

The findings further reflect the distinctive characteristics of Indonesian listed firms, which operate under concentrated ownership structures and substantial state involvement. Dynamic estimation shows that ESG engagement improves asset-based profitability over time, while liquidity and firm size strengthen operational efficiency, indicating the importance of financial flexibility and scale in a relatively volatile emerging market environment. Differences between state-owned (BUMN) and privately owned firms reveal the role of institutional support in sustaining performance persistence, as government-linked firms benefit from resource access and financing stability. The negative impact of the COVID-19 shock confirms the sensitivity of Indonesian firms to external disruptions. These results demonstrate

that firm performance in Indonesia is shaped by financial structure, ownership configuration, and governance quality within a developing institutional framework.

CONCLUSION

The empirical results consistently show positive relationship between ESG performance and firms' asset-based profitability in Indonesia. The mean difference tests show that firms with stronger ESG engagement tend to exhibit higher return on assets, a pattern that is reinforced by the scatter plot analysis, which reveals a more structured and positive ESG–ROA association, particularly during the COVID-19 period where high-ESG firms display greater performance stability. These descriptive findings are corroborated by the dynamic GMM results, which confirm strong performance persistence through a significant lagged return on assets and demonstrate a robust positive effect of ESG performance on return on assets after accounting for endogeneity. In addition, liquidity and firm size are found to positively influence asset-based performance, underscoring the role of financial flexibility and scale advantages in sustaining operational efficiency over time.

This study is subject to several limitations that should be acknowledged when interpreting the findings. The analysis is confined to Indonesian listed firms, which may limit the generalizability of the results to other institutional contexts. Moreover, the reliance on secondary ESG data restricts the ability to capture qualitative differences in the depth and effectiveness of sustainability implementation across firms. These limitations open avenues for future research to extend the empirical framework to cross-country settings within emerging markets and to examine potential non-linear or threshold effects in the ESG–performance relationship. From a policy perspective, the findings underscore the importance of strengthening ESG disclosure standards to enhance transparency and comparability, thereby reducing information asymmetry in capital markets. For regulators and policymakers, particularly in emerging

economies, the results suggest that ESG frameworks should be positioned not merely as compliance requirements but as policy instruments that support firms' operational resilience and long-term competitiveness.

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