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FINANCIAL PERFORMANCE, ESG PERFORMANCE, AND STOCK PRICES IN INDONESIAN ENERGY COMPANIES: THE MEDIATING ROLE OF FIRM SIZE

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ABSTRACT

Objective: This exploratory study examines whether financial performance and ESG performance are associated with the year-end share price (a proxy of firm value) of IDX-listed energy companies, and whether firm size mediates these associations.

Research Design & Methods: Secondary data for 2021–2025 were analysed with PLS-SEM. Purposive sampling from 91 energy companies yielded 48 company-year observations, not 48 independent companies. Financial performance was measured by ROA and ROE; ESG score, firm size (log of total assets), and firm value (year-end closing share price) were single indicators.

Findings: Financial performance is positively associated with share price (β = 0.342; p = 0.001) and firm size (β = 0.189; p = 0.040), and firm size is positively associated with share price (β = 0.295; p = 0.025). ESG performance is associated with neither (p = 0.629 and 0.557). Indirect effects through firm size are not significant (p = 0.138 and 0.605). Because firm size is poorly explained (adjusted R^2 = 0.001; Q^2 = −0.022) and the sample is small, this indicates an absence of evidence for mediation, not evidence of its absence.

Contributions: Share prices are associated more closely with profitability than with ESG scores. Managers should prioritise profitability while integrating ESG into long-term strategy; regulators could consider more standardised and assured ESG reporting (a policy implication not tested here).

Novelty: The study tests financial and ESG performance in one model with firm size as a mediator, a role previously treated as moderating or as a control.

Keywords: Financial Performance; ESG Performance; Firm Size; Share Price; Energy Companies.

JEL codes: G32, M41, Q56

Article type: research paper

INTRODUCTION

The corporate world is moving from a narrow focus on profit towards a broader concern for sustainability. Companies are now expected to deliver sound financial results and, at the same time, to manage their environmental footprint and social responsibilities. The Environmental, Social, and Governance (ESG) framework has therefore become a common yardstick of corporate performance. A meta-analysis of more than 2,000 empirical studies found that the large majority report a non-negative relationship between ESG and corporate financial performance (Friede et al., 2015), and evidence from 24 emerging markets shows that firms with higher ESG scores tend to be more profitable (Bahadori et al., 2021). In Indonesia, however, the evidence on whether the market actually rewards ESG is mixed. Sirait et al. (2026), for example, report that ESG disclosure scores do not significantly affect the firm value of Indonesian energy companies.

The energy sector is a particularly instructive setting. It covers oil and gas exploration and production, coal mining, energy processing, and power and renewable-energy supply, and it remains heavily dependent on fossil resources while facing strong pressure for an energy transition. Several listed energy companies, including PT Adaro Energy Indonesia Tbk, PT Bukit Asam Tbk, PT Medco Energi Internasional Tbk, PT Elnusa Tbk, and PT Pertamina Geothermal Energy Tbk, increased their ESG reporting and implementation during 2021–2025 through emission reduction, renewable-energy development, stronger governance, and more comprehensive sustainability reports. Yet the improvement in ESG practice has not been consistently followed by a rise in firm value. One plausible reason is a trade-off between sustainability investment and short-term profit: ESG implementation is costly and may depress profitability in the short run, and the capacity to implement it differs by firm size, because larger firms have more resources and better access to funding.

The observation period 2021–2025 was chosen for two reasons. First, it follows the pandemic shock of 2020 and covers the post-pandemic recovery and the 2021–2022 commodity-price boom, so that profitability and share prices are not dominated by the 2020 collapse. Second, it coincides with the phase in which sustainability reporting became a regulatory expectation for Indonesian listed companies (OJK Regulation No. 51/POJK.03/2017) and with Indonesia's net-zero commitment announced in 2021 and the Just Energy Transition Partnership agreed in 2022, which raised the salience of ESG in the energy sector. A five-year window is short, which is one reason for the small sample and for the cautious interpretation adopted in this study.

Previous studies fall into three streams, and each leaves a gap. The first links ESG to performance and value. Broad evidence is non-negative (Friede et al., 2015; Bahadori et al., 2021), but Indonesian studies are mixed or null: Xaviera and Rahman (2023) and Sirait et al. (2026) find no significant overall relationship between ESG and firm value, while Dorothy and Endri (2024) and Ryvita and Meidiaswati (2026) continue to treat ESG disclosure as a stand-alone predictor of the value of energy firms, the former with profitability as a moderator. The second stream relates profitability to firm value in IDX energy and mining firms: Putri et al. (2025) find that ROE significantly affects the price-to-book value of energy companies, whereas Ramdhonah et al. (2019) report a negative effect of firm size on the value of mining companies, so findings depend on sample and period. The third stream gives firm size the role of a moderator or control (Putri et al., 2025; Ayem & Seseng, 2026), or places profitability, not size, in the mediating position (Yulimtinan & Atiningsih, 2021). Across the three streams, financial and ESG performance are rarely examined in the same model, and firm size has not been tested as a channel through which they may reach firm value (see the synthesis in Table 1).

Theoretically, financial and ESG performance may reach firm value through firm size in two steps. In the first step, retained profit and, for ESG, better access to finance (Cheng et al., 2014) enlarge the asset base. In the second step, a larger scale is read by investors as a signal of stability and funding capacity and is reflected in the share price (Spence, 1973; Connelly et al., 2011). Whether this chain operates in the energy sector, where assets are lumpy and size differs mainly by ownership and sub-sector, is an empirical question that the existing literature has not addressed.

This study addresses that gap. Its novelty is empirical and contextual rather than methodological: it (i) places financial performance and ESG performance in one structural model, (ii) tests firm size as a mediator and not as a moderator or control, and (iii) does so for energy companies listed on the IDX in 2021–2025, a sector and period shaped by the energy transition and by sustainability pressure. The study is exploratory and associative. Firm value is proxied by the year-end closing share price, so the findings concern this proxy and not firm valuation in general. The objectives are to analyse (i) the association of financial performance and ESG performance with firm value, (ii) their association with firm size, (iii) the association of firm size with firm value, and (iv) whether firm size mediates the associations of financial performance and ESG performance with firm value. The study contributes to the literature on firm value and sustainability in an emerging market, and offers evidence for managers, investors, and regulators on how the market currently prices financial and ESG information in the energy sector.

LITERATURE REVIEW

Signaling Theory

Signaling theory explains how a party with more information conveys it credibly to a less informed party in order to reduce information asymmetry (Spence, 1973; Connelly et al., 2011). In capital markets, management sends signals to investors through financial and non-financial information. Profitability signals the ability to generate returns, firm size signals scale, stability, and access to funding, and ESG reporting signals a commitment to sustainable business practice. Investors use these signals to assess future prospects, which is ultimately reflected in firm value. The theory underpins the framework of this study, and it also implies that a signal moves the market only when it is perceived as credible and relevant. In this study, signaling theory is used as an interpretive lens that indicates the expected sign of each relationship; the data cannot confirm the theory itself, because signal credibility is not measured.

Financial Performance and Firm Value

Financial performance describes the ability of a company to generate profit and manage its resources efficiently. High profitability tells investors that assets and equity are used productively, which raises demand for the shares and thus firm value. Empirical evidence from the Indonesian energy sector supports this view: Putri et al. (2025) find that ROE significantly affects firm value in IDX energy companies. Financial performance may also enlarge the firm. Retained earnings and better access to external funding allow expansion, so that total assets grow. Based on these arguments:

H1: Financial performance has a positive effect on firm value.

H4: Financial performance has a positive effect on firm size.

ESG Performance and Firm Value

Good ESG performance can improve transparency, accountability, and reputation, which lowers perceived risk and attracts investors with a long-term horizon (Friede et al., 2015). The empirical record in Indonesia is nevertheless mixed. Xaviera and Rahman (2023) and Sirait et al. (2026) find no significant effect of ESG on firm value, whereas studies in other emerging markets link ESG to better performance (Bahadori et al., 2021). For firm size (H5), two channels work in opposite directions. On the positive side, firms with better ESG performance face lower capital constraints and obtain finance more easily (Cheng et al., 2014), which allows them to expand their asset base. On the negative side, ESG expenditure is incurred before its benefits arise, and in a fossil-dependent sector it may divert resources from asset growth. The sign of H5 is therefore theoretically ambiguous. Following the signaling perspective, which treats ESG as a credible positive signal, ESG is expected to be associated positively with both firm value and firm size:

H2: ESG performance has a positive effect on firm value.

H5: ESG performance has a positive effect on firm size.

Firm Size and Mediating Role

Firm size, usually measured by total assets, reflects the scale of the firm. Large firms are generally seen as more stable and as having wider access to funding, which strengthens investor confidence (Ayem & Seseng, 2026). The evidence is not uniform, however; Ramdhonah et al. (2019) report a negative effect of firm size on the value of Indonesian mining companies. Firm size has so far been used mainly as a moderating or control variable (Putri et al., 2025; Ayem & Seseng, 2026), and these roles differ from mediation. A control variable removes the influence of a confounder, a moderator changes the strength or direction of a relationship between two other variables (it answers "when"), and a mediator is a variable through which an independent variable is related to a dependent variable (it answers "how"; Baron & Kenny, 1986). Treating size as a mediator therefore requires that financial and ESG performance are related to size (H4 and H5), and that size is in turn related to firm value (H3). The argument for H6 is that profitable firms accumulate assets through retained earnings and better access to funding, and that investors price the resulting scale as a signal of stability. The argument for H7 is that ESG performance eases capital constraints (Cheng et al., 2014) and so enables asset growth, but because ESG costs come first and benefits are long-term, H7 is the least well supported of the three and a null result is as plausible as a positive one. Mediation is assessed by the significance of the indirect effect (Zhao et al., 2010). Because firm size is a slowly changing stock variable whereas profitability is a flow measured over the year, the mediation proposed here is statistical rather than strictly temporal, and it is tested as such. The hypotheses are:

H3: Firm size has a positive effect on firm value.

H6: Financial performance has a positive effect on firm value through firm size.

H7: ESG performance has a positive effect on firm value through firm size.

Synthesis of Previous Studies, Research Gap, and Theoretical Contribution

Table 1 compares the closest previous studies. Three differences set the present study apart. First, no study in the table places financial performance and ESG performance in one model for Indonesian energy companies. Second, in the studies that include firm size it is a moderator or a determinant, not a mediator, and in the one study with a mediator (Yulimtinan & Atiningsih, 2021) the mediator is profitability. Third, most Indonesian studies use a single predictor or a single moderator, so they cannot show whether the associations of profitability and ESG with firm value run through the scale of the firm.

Table 1. Synthesis of previous studies and the research gap

Study	Context	Variables and role of firm size	Main finding	Gap relative to this study
Friede et al. (2015)	Meta-analysis of more than 2,000 studies	ESG and corporate financial performance	Large majority report a non-negative relationship	Aggregate evidence; no sector-specific test and no mediator
Bahadori et al. (2021)	24 emerging markets	ESG and firm performance	Higher ESG scores tend to accompany higher profitability	Accounting performance, not market value; no mediator
Xaviera & Rahman (2023)	Indonesia	ESG performance and firm value; firm life cycle as moderator	ESG not significant overall; governance component significant	Moderator, not mediator; financial performance not in the model
Sirait et al. (2026)	Indonesian energy industry	ESG disclosure score and firm value	No significant effect of ESG on firm value	Single relationship; no firm size or mediation

Study	Context	Variables and role of firm size	Main finding	Gap relative to this study
Dorothy & Endri (2024)	Energy sector	ESG disclosure and firm value; profitability as moderator	–	Profitability as moderator; firm size not tested
Ryvita & Meidiaswati (2026)	Indonesian energy sector	ESG disclosure and firm value	–	Single relationship; no firm size or mediation
Putri et al. (2025)	IDX energy companies	Profitability (ROE) and price-to-book value; firm size as moderator	ROE significant; firm size does not moderate	Size as moderator; ESG not included
Ramdhonah et al. (2019)	IDX mining companies, 2011–2017	Capital structure, size, growth, profitability and firm value	Negative effect of firm size on firm value	Size as determinant; no ESG, no mediation
Ayem & Seseng (2026)	Firm value determinants	Firm size as moderator	Large firms seen as more stable and better funded	Size as moderator; ESG not included
Yulimtinan & Atiningsih (2021)	IDX firms	Leverage, size, sales growth and firm value; profitability as mediator	Profitability examined as the mediator	Mediator is profitability, not size; ESG not included
This study	Indonesian energy companies, 2021–2025	Financial and ESG performance → firm size → share price	Financial performance and firm size positively associated with share price; ESG not; no mediation found	Exploratory; 48 company-years; single indicators; share-price proxy

Source: Compiled by the author from the cited studies (2026)

The theoretical contribution is therefore limited and specific. Beyond applying signaling theory to bivariate relationships, the study asks whether the signals of profitability and ESG travel through scale, that is, whether firm size is a transmission channel or only a separate signal. A finding of no mediation is informative about the energy sector in this period, but it does not test signaling theory directly.

Figure 1 shows the conceptual framework that relates the seven hypotheses.

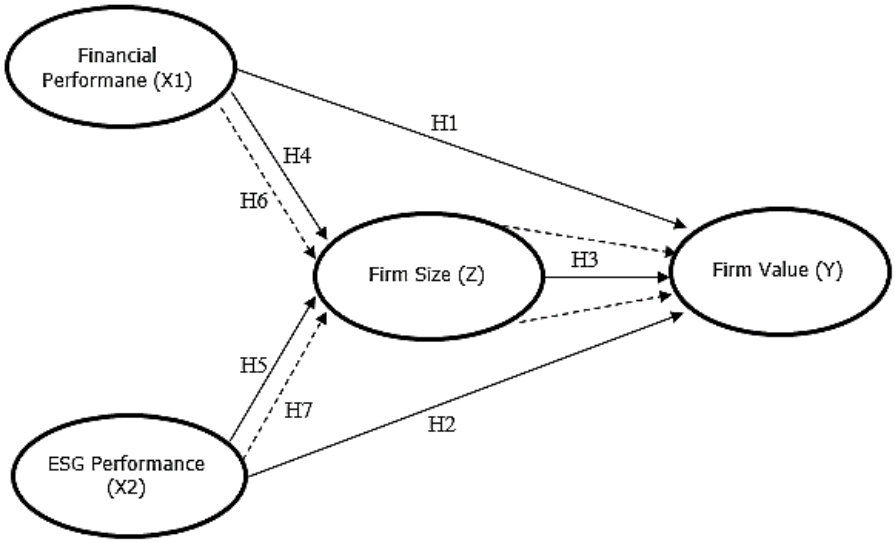


Figure 1. Conceptual framework and hypotheses

METHODS

Research Design and Data Sources

This study applies a quantitative, exploratory, and associative design to examine the association of financial performance (X1) and ESG performance (X2) with firm value (Y), with firm size (Z) as the mediating variable. Secondary data were collected by documentation from the annual financial statements and sustainability reports of the companies, the IDX website (www.idx.co.id), and ESG score data from a secondary ESG database, for the 2021–2025 period. Because the design is observational and all variables are measured contemporaneously, the results are interpreted as associations.

Population and Sample Selection

The population is the 91 energy-sector companies listed on the IDX in 2025 (IDX energy-sector classification, www.idx.co.id). The sample was selected by purposive sampling with four criteria: (1) the company was listed in the energy sector throughout 2021–2025; (2) annual financial statements were available for the years used; (3) an ESG score was available for the years used; and (4) the closing share price and total assets were available for the years used. Table 2 lists the criteria and their purpose. The sample size is the outcome of these criteria. No sampling formula was applied, because a formula such as Slovin's is designed for drawing a random sample from a population in a survey and does not apply to a criteria-based selection from the full list of listed firms.

The final sample consists of 48 company-year observations of energy-sector companies for 2021–2025. Because the same company can appear in several years, the data form a panel. Each observation is one company in one fiscal year, and all variables in an observation refer to the same company and the same fiscal year (see Table 3). Observations of the same company are likely to be correlated over time; the implications for standard errors are discussed under the analytical approach.

Table 2. Sampling criteria

No.	Sampling criterion	Purpose
1	Listed in the IDX energy sector throughout 2021–2025	Keeps the same set of firms across the observation period
2	Annual financial statements available for the years used	Allows ROA, ROE, and total assets to be computed
3	ESG score available for the years used	Allows ESG performance to be measured
4	Closing share price and total assets available for the years used	Allows firm value and firm size to be measured
	Result: 48 company-year observations	Population: 91 energy-sector companies listed in 2025

Source: Data processed (2026)

Variables, Measurement, and Data Timing

Table 3 presents the operational definition, measurement, and timing of each variable. Each observation is matched on the company and the fiscal year t (1 January–31 December). ROA, ROE, and total assets are taken from the audited financial statements for year t, with total assets measured at the year-end balance-sheet date. The ESG score is the score for reporting year t (as reported by the data source; a higher score indicates better ESG performance). Firm value is the closing share price on the last trading day of year t (prices are used as reported and are not adjusted for stock splits or rights issues), so that the price and the balance-sheet data refer to the same date. Because annual reports are published several months after the fiscal year-end, the year-end price may not yet reflect the reported profit. This timing difference is acknowledged as a limitation.

Table 3. Operational definition, measurement, and timing of variables

Variable	Operational definition	Indicator	Measurement and timing	Scale
Firm value (Y)	Investors' perception of the firm, reflected in its market value	Share price	Closing price (IDR) on the last trading day of fiscal year t	Ratio
Financial performance (X1)	Ability of the firm to generate profit and manage its resources	ROA, ROE	ROA = Net income / Total assets; ROE = Net income / Equity; both for fiscal year t	Ratio
ESG performance (X2)	Performance on environmental, social, and governance aspects	ESG score	ESG score for reporting year t from the ESG data source	Ratio
Firm size (Z)	Scale of the firm based on its total assets	Firm size	SIZE = Ln (Total assets at the end of year t)	Ratio

Source: Data processed (2026)

Firm value is measured by the closing share price, a market-based measure that is directly observable and not affected by accounting choices, and that shows how investors price the information available to them at a given date. It has well-known limitations. A share price is a value per share, so it depends on the number of shares outstanding, past stock splits and share issues, and the capital structure of the firm, and it is not the market value of the firm's equity or of its total capital. Prices are therefore not fully comparable across firms; in this sample they range from IDR 86 to IDR 29,500. The implications for interpretation and generalisation are discussed in the Discussion. Tobin's Q, price-to-book value, and market capitalisation are the usual alternative valuation proxies. They are not used in the main model and are recommended as alternative proxies in future research.

Measurement of Financial Performance

Financial performance (X1) is modelled as a reflective construct with two indicators, ROA and ROE. Both are accounting profitability ratios with net income as the numerator. They differ in the denominator: ROA scales profit by total assets (how efficiently assets are used, regardless of how they are financed), and ROE scales it by equity (the return to shareholders, which also reflects leverage). They are treated as two manifestations of one underlying profitability factor, which is supported empirically by their strong common variance (loadings of 0.939 and 0.832, which imply an inter-indicator correlation of roughly 0.78; Table 5) and conceptually by their shared numerator. In SmartPLS the indicators are standardised (mean 0, SD 1) and the construct score is a weighted sum of the standardised indicators, with weights estimated by the PLS algorithm (Mode A outer weights and the path weighting scheme, the SmartPLS 4 defaults). ROA and ROE are therefore not simply averaged, and their different scales (the standard deviation of ROE is nearly six times that of ROA, Table 4) do not distort the composite. Standardisation, however, does not remove the influence of extreme values, which is addressed below.

The reflective specification follows the criteria of Jarvis et al. (2003): the indicators are interchangeable manifestations of one underlying construct (profitability), they share a common theme because both divide net income by a balance-sheet base, they are expected to covary (the implied correlation is about 0.78), and a change in underlying profitability would be expected to change both. A formative (composite) specification would be preferred if the two ratios captured distinct aspects of performance, for example operating margin and asset turnover. Because ROE also reflects leverage, the reflective assumption is an approximation, and the sensitivity analysis therefore includes a model with ROA as the sole indicator.

The two-indicator specification is minimal. Reliability statistics based on two indicators are imprecise, and because the two ratios share a numerator, part of their common variance may reflect shared accounting noise rather than a distinct performance factor. Results involving financial performance should therefore be interpreted with caution.

Analytical Approach and Suitability

Data were analysed with Partial Least Squares Structural Equation Modelling (PLS-SEM) in SmartPLS 4. PLS-SEM was chosen because the model contains several dependent constructs and an indirect path that are estimated simultaneously; because several variables (ROE, share price) are strongly non-normal, and PLS-SEM relies on non-parametric bootstrapping rather than distributional assumptions; and because the sample is small (Hair et al., 2019). The data structure, however, limits what the method can add, and its implications are stated here so that the results are interpreted correctly. First, three of the four constructs (ESG performance, firm size, and firm value) have a single indicator. Single-item measurement is defensible for concrete, unidimensional, and objectively measured quantities such as total assets and the share price (Diamantopoulos et al., 2012). It does mean that loadings, Cronbach's alpha, composite reliability, and AVE equal 1.000 by construction and say nothing about measurement quality, so only the financial performance construct is genuinely evaluated by the measurement-model criteria. Measurement error is not modelled for the single indicators (their reliability is implicitly fixed at 1), so structural coefficients involving them, notably the ESG score, may be attenuated. Second, with one latent construct and three observed variables, the structural model is in effect a path analysis, and PLS-SEM adds little beyond the composite for financial performance and the bootstrap procedure. The structural results are therefore read as path-analytic estimates rather than as evidence of a fully latent structural model.

Third, the structural model is saturated, because all five possible paths among the four constructs are estimated. SRMR and NFI therefore cannot test the structural paths and are reported only for completeness. Fourth, 48 observations is a small sample. With three predictors, about 76 observations are needed to detect a medium effect ($f^2 = 0.15$) with 80% power at the 5% level (Cohen, 1992), so the tests have limited power: significant results close to the 5% boundary are tentative, and non-significant results, including the indirect effects, are not evidence of no effect. Because the observations are company-years, observations of the same company may not be independent, which can understate standard errors, so marginal p-values are interpreted with particular caution. Appropriate remedies are a company-clustered bootstrap or cluster-robust standard errors (Cameron & Miller, 2015); because SmartPLS does not provide these directly, they are not applied here and are noted as a limitation.

The outer model was assessed through convergent validity (loading > 0.70 and AVE > 0.50), discriminant validity (the square root of AVE compared with inter-construct correlations; Fornell & Larcker, 1981; Henseler et al., 2015), and reliability (composite reliability and rho_A > 0.70; Cronbach's alpha > 0.70 is also reported, although it is a crude statistic with only two indicators). The inner model was assessed through R^2, predictive relevance Q^2 obtained by blindfolding ($Q^2 > 0$ indicates predictive relevance), and model fit through SRMR (< 0.10) and the NFI (values above 0.90 are conventionally considered acceptable; Bentler & Bonett, 1980). Hypotheses were tested with bootstrapping (5,000 subsamples): an effect is significant when the t-statistic exceeds 1.96 and the p-value is below 0.05. Mediation was judged from the significance of the indirect effect and the significance of the direct effect (Zhao et al., 2010). In PLS-SEM terminology an "effect" is a standardised path coefficient; here it denotes a statistical association and does not imply causation.

Outlier Assessment

Extreme values were screened with descriptive statistics, standardised scores (|z| > 3), and box plots of each variable. Following Aguinis et al. (2013), flagged observations were first checked for errors and definitional problems (for example, an ROE computed on negative or very small equity is not interpretable as a return), and were retained in the main model only if they were genuine data points. Because the extreme values could not be excluded on definitional grounds, they were retained, and the sensitivity of the results to them is discussed as a limitation. The results are therefore conditional on the inclusion of these values and on the use of the unadjusted share price.

RESULTS

Descriptive Statistics

Table 4 summarises the 48 observations. ROA averages 5.42% (SD = 7.10%), with a minimum of −20.42% showing that some companies recorded losses. ROE is highly dispersed (minimum −261.09%, maximum 36.66%, SD = 41.82%). The average ESG score of 39.34 (range 7.65–57.31) indicates ESG practice that is moderate and uneven across companies. Firm size is relatively homogeneous (SD = 1.40), and share prices vary widely, from IDR 86 to IDR 29,500, a range of about 340 times.

Table 4. Descriptive statistics of research variables

Variable	N	Minimum	Maximum	Mean	Std. deviation
ROA (%)	48	−20.42	23.23	5.42	7.10
ROE (%)	48	−261.09	36.66	0.84	41.82
ESG score	48	7.65	57.31	39.34	12.25
SIZE (Ln total assets)	48	26.34	33.22	30.68	1.40
Share price (IDR)	48	86	29,500	3,895.15	5,594.47

Source: Data processed (2026)

Standardising the extremes in Table 4 shows which variables are affected. The minimum ROE (−261.09%) lies 6.3 standard deviations below the mean (z = −6.26), the minimum ROA and the minimum SIZE lie 3.6 and 3.1 standard deviations below their means (z = −3.64 and z = −3.10), and the maximum share price lies 4.6 standard deviations above its mean (z = 4.58), which also shows that the price distribution is strongly right-skewed. The ROE value is the most influential. From the reported mean and standard deviation, removing a single observation of −261.09% would raise the mean ROE from 0.84% to about 6.4% and reduce its standard deviation from 41.8 to about 16 (approximate, because it is based on rounded statistics), so the mean of 0.84% says little about the typical company. Such a value typically reflects a loss relative to a very small equity base, for which ROE is not readily interpretable as a return. The observation is retained in the main model as a reported data point, and the results are interpreted as conditional on its inclusion.

Measurement Model (Outer Model)

Table 5 shows that all loadings exceed 0.70: ROA (0.939) and ROE (0.832) load on financial performance, while ESG score, share price, and SIZE are single indicators, so their loadings equal 1.000 by construction and carry no information about measurement quality. Table 6 shows that the square root of AVE of financial performance (0.887) is higher than its correlations with the other constructs (the largest is 0.400, with firm value), which supports its discriminant validity; for the single-indicator constructs the comparison is not informative, because their square root of AVE is fixed at 1.000. Table 7 shows that financial performance meets the reliability criteria (Cronbach's alpha = 0.742; rho_A = 0.859; composite reliability = 0.880; AVE = 0.787), although with only two indicators these statistics are imprecise. The single-indicator constructs take the value 1.000 on all reliability statistics, which is again a consequence of the specification.

Table 5. Convergent validity (outer loadings)

Indicator	ESG performance	Financial performance	Firm value	Firm size
ESG score	1.000			
Share price			1.000	
ROA		0.939		
ROE		0.832		
SIZE				1.000

Note: Values of 1.000 for ESG score, share price, and SIZE are fixed by the single-indicator specification and carry no information about measurement quality; only the loadings of ROA and ROE are informative. Source: Data processed (2026)

Table 6. Discriminant validity (square root of AVE on the diagonal)

Construct	ESG performance	Financial performance	Firm value	Firm size
ESG performance	1.000			
Financial performance	−0.029	0.887		
Firm value	−0.101	0.400	1.000	
Firm size	−0.088	0.192	0.366	1.000

Note: The diagonal and the correlations of single-indicator constructs are fixed by the specification; only the comparison for financial performance is informative. Source: Data processed (2026)

Table 7. Construct reliability

Construct	Cronbach's alpha	rho_A	Composite reliability	AVE
ESG performance	1.000	1.000	1.000	1.000
Financial performance	0.742	0.859	0.880	0.787
Firm value	1.000	1.000	1.000	1.000
Firm size	1.000	1.000	1.000	1.000

Note: Statistics of 1.000 for the single-indicator constructs hold by construction; only financial performance is evaluated by these criteria. *Source:* Data processed (2026)

Structural Model (Inner Model)

Figure 2 presents the PLS algorithm output with the path coefficients, and Figure 3 the bootstrapping output. As Table 8 shows, the model explains 20.0% of the variance in firm value (adjusted R^2 = 0.200; R^2 = 0.251), whereas financial and ESG performance together explain 4.4% of the variance in firm size (R^2 = 0.044), which falls to essentially zero after adjustment (adjusted R^2 = 0.001). Blindfolding (Figure 4) gives a Q^2 of 0.120 for firm value, a small but positive predictive relevance, and a negative Q^2 for firm size (−0.022), which means that the model predicts firm size worse than the sample mean and has no predictive relevance for that construct. SRMR is 0.059 (< 0.10), but the NFI of 0.647 is well below the conventional 0.90 level (Table 9). Because the structural model is saturated, the saturated and the estimated models have identical fit values, so these indices do not provide an independent test of the structural paths.

Table 8. Coefficient of determination (R^2) and predictive relevance (Q^2)

Construct	R^2	Adjusted R^2	SSO	SSE	Q^2 (= 1 − SSE/SSO)
Firm value	0.251	0.200	48.000	42.216	0.120
Firm size	0.044	0.001	48.000	49.075	−0.022

Source: Data processed (2026)

Table 9. Model fit

Fit index	Saturated model	Estimated model
SRMR	0.059	0.059
d_ULS	0.053	0.053
d_G	0.043	0.043
Chi-square	13.275	13.275
NFI	0.647	0.647

Source: Data processed (2026)

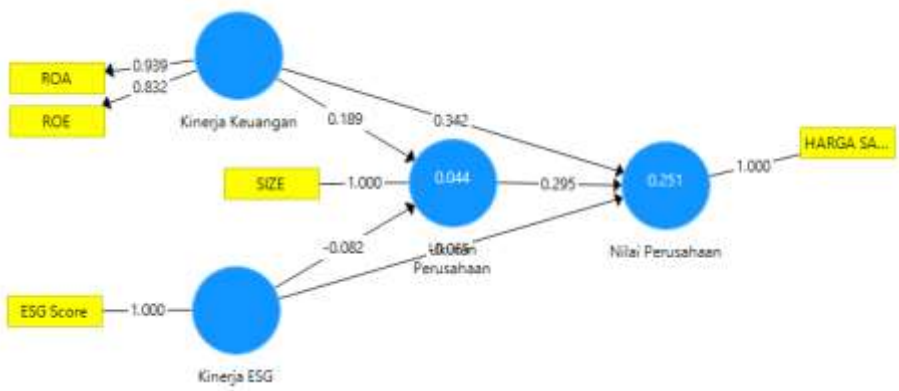


Figure 2. PLS algorithm result (path coefficients and R^2)

Figure 2 shows the estimated structural model. On the measurement side, ROA (0.939) and ROE (0.832) load strongly on financial performance, while ESG score, share price, and SIZE are single indicators with loadings of 1.000. On the structural side, the path coefficients show that financial performance has the largest effect on firm value (0.342), followed by firm size (0.295), whereas the effect of financial performance on firm size is smaller (0.189). Both ESG paths are small and negative (−0.065 to firm value and −0.082 to firm size), so the direction of the ESG effect is not in line with the hypotheses. The values inside the ellipses are R^2: 0.251 for firm value and 0.044 for firm size, which shows that the model explains firm value far better than firm size.

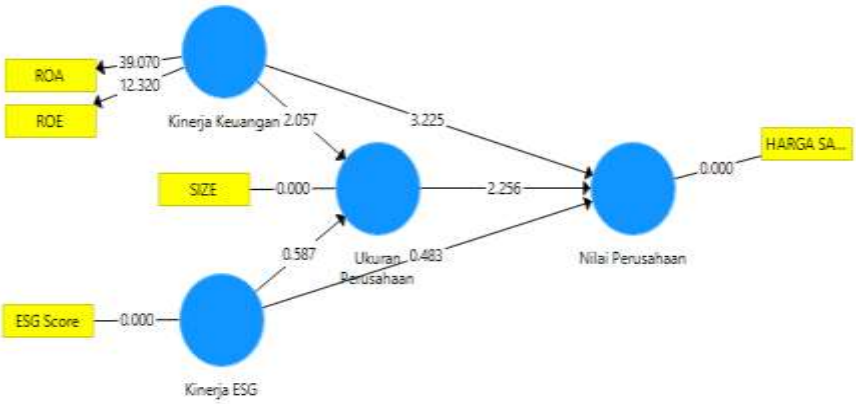


Figure 3. Bootstrapping result (t-statistics)

Figure 3 reports the t-statistics from bootstrapping, which are compared with the critical value of 1.96. Three paths exceed it: financial performance to firm value (3.225), firm size to firm value (2.256), and financial performance to firm size (2.057), so these effects are significant at the 5% level; the last of these is only just above the critical value. The two ESG paths, to firm size (0.587) and to firm value (0.483), are far below 1.96 and are not significant. The indicator loadings of financial performance are also significant (ROA 39.070; ROE 12.320), which confirms that both ratios represent the construct. The loadings of the single indicators are fixed at 1.000 and have no t-statistic, so none is shown for them.

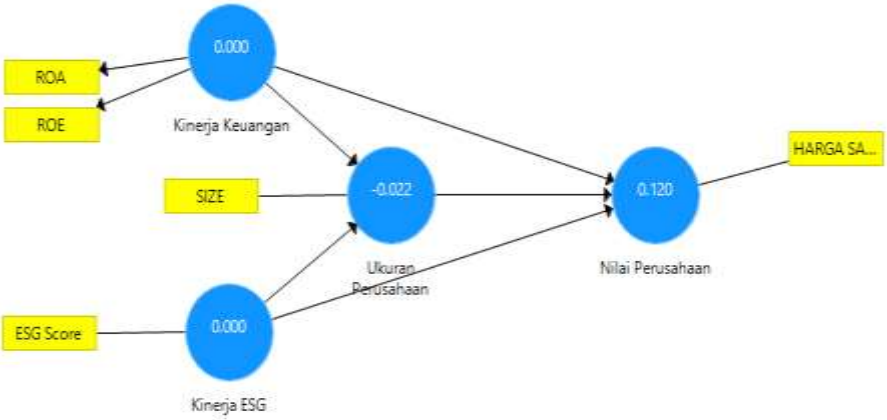


Figure 4. Blindfolding result (Q^2)

Figure 4 shows the predictive relevance (Q^2) obtained by blindfolding. Firm value has a Q^2 of 0.120, which is above zero and therefore indicates predictive relevance, although in the weak category. Firm size has a Q^2 of −0.022, below zero, so the model cannot predict firm size and the structural relationships that explain it should be interpreted with caution. Q^2 is not computed for the exogenous constructs (financial performance and ESG performance), so none is shown for them.

Hypothesis Testing

Table 10 reports the direct effects. Financial performance has a positive and significant effect on firm value (β = 0.342; t = 3.225; p = 0.001) and on firm size (β = 0.189; t = 2.057; p = 0.040), and firm size has a positive and significant effect on firm value (β = 0.295; t = 2.256; p = 0.025). H1, H3, and H4 are therefore supported statistically, although H3 and H4 rest on p-values close to 0.05 in a small sample. ESG performance has no significant effect on firm value (β = −0.065; t = 0.483; p = 0.629) or on firm size (β = −0.082; t = 0.587; p = 0.557), so H2 and H5 are not supported.

Table 10. Direct effects

Hypothesis / path	Original sample (O)	Sample mean (M)	Std. dev.	T-statistics	P-value	Decision
H1: Financial performance → Firm value	0.342	0.337	0.106	3.225	0.001	Supported
H2: ESG performance → Firm value	−0.065	−0.070	0.134	0.483	0.629	Not supported
H3: Firm size → Firm value	0.295	0.283	0.131	2.256	0.025	Supported
H4: Financial performance → Firm size	0.189	0.195	0.092	2.057	0.040	Supported
H5: ESG performance → Firm size	−0.082	−0.085	0.140	0.587	0.557	Not supported

Source: Data processed (2026)

Table 11 reports the indirect effects. The indirect effect of financial performance on firm value through firm size is not significant (β = 0.056; t = 1.487; p = 0.138), and neither is the indirect effect of ESG performance (β = −0.024; t = 0.517; p = 0.605). H6 and H7 are therefore not supported: the data show no mediation by firm size.

Table 11. Indirect effects

Hypothesis / path	Original sample (O)	Sample mean (M)	Std. dev.	T-statistics	P-value	Decision
H6: Financial performance → Firm size → Firm value	0.056	0.056	0.038	1.487	0.138	Not supported
H7: ESG performance → Firm size → Firm value	−0.024	−0.028	0.047	0.517	0.605	Not supported

Source: Data processed (2026)

Table 12 reports approximate 95% confidence intervals for the direct and indirect effects, computed as the original estimate ± 1.96 bootstrap standard errors. The intervals of the ESG paths and of both indirect effects include zero and are wide. The interval of the indirect effect of financial performance (−0.018 to 0.130) is compatible with no mediation and with a modest positive one, which shows that the test has little power to distinguish the two. The intervals of H3 and H4 exclude zero, but their lower bounds (0.038 and 0.009) are close to it, so these paths are tentative.

Table 12. Direct and indirect effects with approximate 95% confidence intervals

Hypothesis / path	Estimate	Std. dev.	Approx. 95% CI	Excludes zero?
H1: Financial performance → Firm value	0.342	0.106	0.134 to 0.550	Yes
H2: ESG performance → Firm value	−0.065	0.134	−0.328 to 0.198	No
H3: Firm size → Firm value	0.295	0.131	0.038 to 0.552	Yes
H4: Financial performance → Firm size	0.189	0.092	0.009 to 0.369	Yes
H5: ESG performance → Firm size	−0.082	0.140	−0.356 to 0.192	No
H6: Financial performance → Firm size → Firm value	0.056	0.038	−0.018 to 0.130	No
H7: ESG performance → Firm size → Firm value	−0.024	0.047	−0.116 to 0.068	No

Note: Interval = estimate ± 1.96 × bootstrap standard deviation (5,000 subsamples). Source: Data processed (2026)

These mediation results have to be read together with the weak model for firm size. Financial and ESG performance explain 4.4% of the variance in firm size, and essentially none once the number of predictors is taken into account (adjusted R^2 = 0.001), and the negative Q^2 (−0.022) shows that the model predicts firm size worse than the sample mean. The path from financial performance to firm size (β = 0.189; t = 2.057) is only marginally significant (p = 0.040) and carries little explanatory weight. The indirect effect of financial performance (0.189 × 0.295 = 0.056) is small relative to its standard error (0.038) and, taken at face value, would account for about 14% of the total effect (0.342 + 0.056 = 0.398), but it is not statistically significant. In the typology of Zhao et al. (2010), the effect of financial performance is direct-only (no mediation) and that of ESG performance is no-effect (no mediation). With 48 observations and a poorly predicted mediator, however, the test has low power. The correct conclusion is therefore that the data provide no evidence that firm size transmits the effects of financial or ESG performance to firm value, not that firm size has been shown to be irrelevant as a mechanism.

Sensitivity and Robustness Checks

The results in Tables 10 and 11 are conditional on the inclusion of the extreme ROE observation, on the use of the unadjusted share price, and on the assumption that company-year observations are independent. Because the ROE indicator is strongly affected by the extreme value, the positive association of financial performance should be interpreted with caution. Sensitivity analyses were not performed in this study, and the results should be read as conditional on these three choices. The analyses that would test them are: (a) winsorising the indicators at the 1st and 99th percentiles; (b) using ROA as the sole indicator of financial performance; (c) using the natural logarithm of the share price as the measure of firm value; (d) excluding the extreme ROE

observation; and (e) using a company-clustered bootstrap or cluster-robust standard errors. They are a priority for future research and are listed among the limitations.

DISCUSSION

Financial performance is positively associated with firm value (H1). This is consistent with signaling theory: profitability is a signal that investors can read directly, because it indicates that assets and equity are used productively, and shares of more profitable firms may attract more demand. The result agrees with Putri et al. (2025), who find that ROE is significantly related to the value of IDX energy companies, and it fits the picture of an energy sector in which financial results are priced more clearly than ESG (Sirait et al., 2026). Financial performance is also positively associated with firm size (H4), which is compatible with the view that profit provides internal funds and better access to external funding for productive assets. This path is, however, only marginally significant ($p = 0.040$), its confidence interval has a lower bound of 0.009, and it explains little of the variation in firm size (see below), so it should be read as tentative. Firm size is positively associated with firm value (H3), in line with the view that large firms are perceived as more stable, better able to survive uncertainty, and better funded (Ayem & Seseng, 2026). The finding contrasts with Ramdhonah et al. (2019), who report a negative size effect for mining firms in an earlier period, which suggests that the role of size depends on sample and period. Because firm value is represented by the price per share, the positive size association must also be read in light of the measurement limitations discussed below.

ESG performance is not significantly associated with firm value (H2) or firm size (H5). This is consistent with Sirait et al. (2026) for Indonesian energy firms and with Xaviera and Rahman (2023), and it differs from the positive ESG–performance relationship reported in broader samples (Friede et al., 2015; Bahadori et al., 2021), which are not specific to a fossil-dependent sector and mostly concern accounting performance. Three explanations are plausible, although this study did not test them. First, investors in this sector may still rely on financial indicators and treat ESG as supplementary. Second, ESG benefits are mostly long-term, while market prices respond quickly to profit information. Third, the ESG score of the sample is moderate and uneven (mean 39.34; SD 12.25) and depends on the availability of sustainability data, so that it may not yet be a differentiating signal. For firm size, ESG costs are incurred before benefits arise, so ESG practice may not translate into asset growth within the observation period. The ESG coefficients are also estimated from a single indicator without correction for measurement error, so they may be attenuated, and their confidence intervals (Table 12) are wide enough to include modest positive and negative associations.

Firm size is not found to mediate the association between financial performance and firm value (H6). Financial performance has a significant direct association with firm value and its indirect path through firm size is not significant, which, in the typology of Zhao et al. (2010), is a direct-only pattern (no mediation): in this sample, the association between profitability and the share price is not shown to run through a larger balance sheet. This conclusion has to be qualified by the weakness of the firm-size equation and by low power. The model explains almost none of the variance in firm size (adjusted $R^2 = 0.001$) and does not predict it out of sample ($Q^2 = -0.022$), so firm size is a poor candidate mediator in this specification. The confidence interval of the indirect effect (-0.018 to 0.130) includes both zero and moderate positive values, so the non-significant result cannot be read as evidence that mediation is absent. Several reasons for the weak size equation are plausible, although this study did not test them. Total assets change slowly, whereas profit is a flow measured over a single year, so a contemporaneous design is unlikely to capture asset growth that follows profit with a lag. Differences in size between firms are driven mainly by factors that are not in the model, such as ownership (state-owned versus private firms), sub-sector (coal, oil and gas, power), and capital intensity. The low variation of size in the sample (SD = 1.40) further limits its capacity to transmit effects. For ESG (H7), neither the direct nor the indirect path is significant, so there is no association to be mediated. A lagged design, with profitability and ESG measured in year t and firm size in year t+1 or later, would be a more appropriate test of the proposed mechanism.

The interpretation of the results is also bounded by the measurement choices. Firm value is represented by the closing share price, which is a value per share rather than a valuation of the firm. Two companies with the same market capitalisation or the same Tobin's Q can have very different share prices if they have different numbers of shares outstanding, different histories of splits and share issues, or different capital structures, and the sample prices span a range of about 340 times (IDR 86 to IDR 29,500). The coefficients of financial performance and firm size on firm value should therefore be read as associations with the level of the share price, not with valuation relative to book value, assets, or capital employed, and the positive size effect may partly reflect differences in share counts and price levels rather than a higher valuation of large firms. Single-item measurement of ESG performance, firm size, and firm value, and the two-indicator measurement of financial performance, mean that the structural coefficients are estimated without correction for measurement error, and the extreme ROE value reduces the precision of the financial performance construct. The results refer to 48 observations of Indonesian energy companies in 2021–2025 and should not be generalised to other sectors, countries, periods, or value measures such as price-to-book value or Tobin's Q, for which the relationships could differ.

The results are compatible with signaling theory for financial information and for scale, but not for ESG, which has not become a decision-relevant signal for year-end share prices in this sample. Because the study does not measure signal credibility and the sample is small, the findings are best read as exploratory evidence and not as a test of the theory. The implications that follow are tied to the observed associations. For managers, profitability shows the strongest association with the share price ($\beta = 0.342$), so profitability and efficient asset management remain the priority; ESG can be integrated into long-term strategy to protect reputation and meet future stakeholder demands, but this sample gives no evidence that it raises year-end prices in the short run. For investors, financial ratios were the main correlate of prices, and ESG scores should be used as a complement and read with care given their moderate and uneven quality; ROE in particular should be checked for very small or negative equity. For regulators, the weak association between ESG scores and prices may reflect low information content, so more standardised and better-assured ESG reporting could raise it. This is a policy implication drawn from the discussion and was not tested in this study.

CONCLUSION

This study examined whether financial performance and ESG performance are associated with firm value, measured by the year-end closing share price, in energy companies listed on the IDX during 2021–2025, and whether firm size mediates these associations. In line with the four objectives, the findings are as follows. First, financial performance is positively associated with the share price ($\beta = 0.342$), whereas ESG performance is not ($\beta = -0.065$). Second, financial performance is positively associated with firm size ($\beta = 0.189$; $p = 0.040$, a marginal result), whereas ESG performance is not ($\beta = -0.082$). Third, firm size is positively associated with the share price ($\beta = 0.295$; $p = 0.025$), a result that partly reflects the use of price per share. Fourth, no evidence of mediation is found: the indirect effects are not significant ($p = 0.138$ and $p = 0.605$). This last conclusion rests on a weak model for firm size (adjusted $R^2 = 0.001$; $Q^2 = -0.022$) and on 48 company-year observations, so it indicates the absence of evidence for mediation and not evidence of its absence. All findings refer to year-end share prices of Indonesian energy companies in 2021–2025 and are statistical associations, not causal effects.

The theoretical contribution is modest: the study shows that, in this sample, the signals of profitability and scale are associated with share prices while ESG scores are not, and that firm size does not carry the associations of profitability or ESG to the share price. It does not test signaling theory directly. For managers, the results point to profitability and efficient asset management as the priority, with ESG pursued as a long-term strategy. For investors, financial ratios remained the main correlate of year-end prices. For regulators, the weak association of ESG scores with prices suggests that more standardised and assured ESG reporting could increase the information content of ESG scores; this is a policy implication and not a tested result.

The study has the following limitations. The sample of 48 company-years from one sector gives limited statistical power and limited generalisability, and observations of the same company may not be independent. Financial performance has two indicators that share a numerator, ROE contains an extreme value (−261.09%), and ESG performance, firm size, and firm value are single indicators without correction for measurement error. Firm value is the price per share and does not account for shares outstanding or capital structure. All variables are measured contemporaneously, so temporal ordering and causality are not established, and other determinants such as capital structure, dividend policy, ownership, and macroeconomic factors are omitted. Future research should use a larger company-year panel with lagged firm size, company-clustered inference, and the sensitivity analyses described above; use more indicators of financial performance (for example, net profit margin or return on capital employed); analyse the environmental, social, and governance pillars separately; and use alternative value measures such as Tobin's Q, price-to-book value, or market capitalisation.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no financial, personal, or professional conflicts of interest that could have influenced the research, authorship, or publication of this manuscript.

RESEARCH ETHICS STATEMENT

This study uses secondary data from established, publicly available databases. The research does not involve direct interaction with human participants, interviews, surveys, experiments, or collecting personally identifiable information. Therefore, the study does not involve human-subject research requiring informed consent. All data were used solely for academic and research purposes and were analysed in accordance with applicable ethical standards and the terms of access and use of the respective data sources.

AI USAGE STATEMENT

Generative artificial intelligence (AI) tools were utilized exclusively to support the language editing process, including grammatical correction, sentence refinement, and enhancement of the manuscript's clarity, coherence,

and readability. AI tools were not employed to generate research data, perform statistical analyses, or independently develop the study's findings and conclusions. OpenAI ChatGPT (version 5.2) was used by the author solely as a language-editing and writing-support tool. All AI-assisted outputs were carefully reviewed, verified, and subsequently revised by the author to ensure their accuracy, appropriateness, and alignment with the research content prior to manuscript submission.

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