

ECO-EFFICIENCY, CARBON EMISSION DISCLOSURE, AND FIRM VALUE: DOES ENVIRONMENTAL PERFORMANCE MATTER?

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Abstract

This study aims to analyze the effect of eco-efficiency and carbon emission disclosure on firm value, with environmental performance as a moderating variable and firm size as a control variable. The research object consists of energy sector companies listed on the Indonesia Stock Exchange (IDX) during the 2021-2024 period. A quantitative method was employed using panel data regression with a fixed effect model, and a purposive sampling technique yielded a sample of 12 companies. Secondary data were obtained from financial statements, annual reports, and sustainability reports. The results indicate that eco-efficiency has no significant effect on firm value, carbon emission disclosure has a significant positive effect on firm value, environmental performance is unable to moderate the effect of eco-efficiency on firm value, environmental performance weakens the effect of carbon emission disclosure on firm value, and firm size has a significant negative effect on firm value.

Keyword: *Firm Value, Eco-efficiency, Carbon Emission Disclosure, Environmental Performance*

Introduction

Firm value is a key benchmark for investors in assessing corporate performance, as it reflects market confidence in a company's future business prospects and is often regarded as an indicator of the success of the business strategies a company has implemented (Tonay & Murwaningsari, 2022; Septianingrum, 2022). Indonesia's energy sector, which encompasses oil, gas, coal, and renewable energy, is a strategic sector that contributes significantly to national economic growth. However, this sector has faced considerable pressure with respect to sustainability and market confidence in recent years.

This phenomenon is reflected in the performance of the Indonesia Composite Index (IHSG) during the first half of 2023. Based on Indonesia Stock Exchange (IDX) data, energy sector shares recorded a significant decline of up to 25% on a year-to-date basis between January and May 2023, while the IHSG itself fell by 217.36 points (3.79%) to 6,633.26 by the end of May 2023. Five of the ten shares that most heavily weighed down the index during this period originated from the energy sector, particularly coal issuers: PT Bayan Resources Tbk (BYAN) fell by 28.6%, PT Adaro Energy Indonesia Tbk (ADRO) weakened by as much as 47%, PT Bumi Resources Tbk (BUMI) dropped by 40.4%, PT Indo Tambangraya Megah Tbk (ITMG) declined by 43.3%, and PT Adaro Minerals Indonesia Tbk (ADMR) fell by 54% (Situmorang, 2023; Taufani, 2023). This sustained decline in share prices indicates deteriorating firm value among energy sector issuers and signals weakening investor confidence in the sector's future prospects, despite firm value being known to be influenced by multiple factors, including eco-efficiency, carbon emission disclosure, profitability, dividend policy, and stock price (Kurnia, 2019; Pratama & Ainiyah, 2023).

The first research gap concerns the effect of eco-efficiency on firm value, where prior findings remain inconsistent. Bongsoikrama et al. (2024) and Damas et al. (2021a) report that effectively implemented eco-efficiency helps stabilize stock prices, improve profitability, and enhance firm value through operational cost efficiency and improved corporate reputation. In contrast, Yuliandhari et al. (2023) find that eco-efficiency has no significant effect on firm value, suggesting that not all investors regard environmental efficiency as a material valuation factor.

A second, related gap concerns carbon emission disclosure. Rahmanita (2020a) finds that carbon emission disclosure enhances firm value through greater transparency to investors, and Liu et al. (2023) show that companies with comprehensive and well-structured carbon disclosure tend to attract greater interest from institutional investors. Conversely, Dianti & Puspitasari (2024) find that insufficient carbon emission disclosure can generate negative perceptions among stakeholders, while Anggraeni (2024) reports that carbon emission disclosure has no significant effect on firm value at all — indicating that the market's response to this disclosure is not yet uniform across firms and industries.

A third gap concerns the moderating role of environmental performance. Kristianto et al. (2024) indicate that sustainability strategies, including eco-efficiency and carbon emission disclosure, jointly have a positive impact on firm value in the energy sector, whereas Surianti et al. (2024) find that this relationship is not always consistent, particularly when it is not supported by strong environmental performance. Similarly, Sagala & Kusumadewi (2023) find that environmental performance, as reflected in a company's PROPER rating, positively affects firm value, while Fitriana et al. (2024) report that companies with poor environmental performance experience declining investor trust even when they have implemented eco-efficiency measures — suggesting that environmental performance may not always strengthen, and may even offset, the benefits of sustainability-related disclosures.

Firm size is commonly used as a control variable in sustainability research, as larger firms tend to be more proactive in implementing sustainability strategies and have broader access to the financial and human resources needed to support such implementation (Santoso & Yanti, 2024; Mansour et al., 2024). Given the persistent inconsistency of prior findings regarding the effect of eco-efficiency and carbon emission disclosure on firm value — and the unclear role of environmental performance as a moderator — this study seeks to fill that gap by examining the effect of eco-efficiency and carbon emission disclosure on firm value, with environmental performance as a moderating variable and firm size as a control variable, focusing on energy sector companies listed on the IDX during 2021-2024. Specifically, this study aims to: (1) examine the effect of eco-efficiency on firm value; (2) examine the effect of carbon emission disclosure on firm value; (3) examine the moderating role of environmental performance on the effect of eco-efficiency on firm value; and (4) examine the moderating role of environmental performance on the effect of carbon emission disclosure on firm value.

Literature Review

Signalling theory explains that management provides signals in the form of information to investors in order to reduce information asymmetry regarding a firm's future prospects (Rochman & Andayani, 2023; Saraswati & Herawaty, 2019). In the context of this study, the implementation of eco-efficiency and the disclosure of carbon emissions represent voluntary signals through which management communicates its environmental responsibility and operational efficiency to the market; a company that discloses such information more extensively is understood to be sending a more credible positive signal than one that does not, since it demonstrates that management possesses favorable information about the firm's environmental management that it is willing to share. Likewise, a company's environmental performance, as reflected in its PROPER rating, functions as an additional, externally verified signal that either reinforces or undermines the credibility of its eco-efficiency and carbon disclosure practices in the eyes of investors. When these signals are perceived as positive and credible, investors are expected to respond favorably, which in turn drives up stock prices and firm value; conversely, weak or inconsistent signals may fail to move investor perception, which helps explain why not every sustainability-related disclosure examined in this study translates into a higher firm value (Setiawan & Wibowo, 2021).

Legitimacy theory posits that companies must continuously ensure that their operations align with prevailing societal norms in order to gain acceptance from external stakeholders (Sulistiawati & Dirgantari, 2017; Hapsari, 2023). This is particularly relevant to the energy sector examined in this study, which is widely regarded as one of the largest contributors to environmental degradation and carbon emissions in Indonesia and therefore faces heightened scrutiny from the public, regulators, and investors regarding its environmental conduct. Within this framework, eco-efficiency initiatives, carbon emission disclosure, and participation in the government's PROPER environmental performance assessment can be understood as legitimizing actions through which energy companies seek to demonstrate compliance with environmental norms and secure a social license to operate. Legitimacy is regarded as a strategic asset that supports the long-term sustainability of a company (Emalia & Shauki, 2023); accordingly, companies that are perceived by stakeholders as having successfully legitimized their environmental practices are expected to enjoy greater market trust and, ultimately, higher firm value than those whose legitimacy remains in question.

Firm Value (dependent variable) represents the market's assessment of a company as reflected in its stock price, and is regarded as a critical indicator because it embodies investors' collective judgment of a firm's investment decisions, financing decisions, and asset management, ultimately representing the level of wealth held by the company and its shareholders (Salim & Murtanto, 2024). A higher firm value reflects greater investor confidence in the company's future business prospects and its ability to preserve and grow shareholder wealth (Rahmanita, 2020a; Liu et al., 2023). In this study, firm value is measured using Tobin's Q, a market-based ratio that captures both a company's current investment opportunities and its overall market valuation relative to the capital invested in its productive assets.

Eco-efficiency (independent variable) is an environmental management philosophy that encourages companies to pursue economic gain while simultaneously improving environmental quality, by optimizing the use of raw materials and energy and minimizing the waste generated from business operations (Marini & Herawaty, 2024; Damas et al., 2021a). Beyond serving as an internal operational strategy, eco-efficiency also functions as an image-building mechanism that signals a company's responsible stance toward the

environmental risks arising from its activities, making it a relevant strategy for energy sector firms whose core operations are inherently resource- and emission-intensive.

Carbon Emission Disclosure (independent variable) refers to the recording, recognition, measurement, and disclosure of quantitative and qualitative information related to the greenhouse gas emissions a company generates from its operational activities (Rochmah, 2022; Dewi & Agustina, 2023). This practice is closely tied to global reporting frameworks such as the Global Reporting Initiative (GRI) and IFRS S1/S2, and is typically communicated through information on energy use, emission-reduction targets, and climate-related risks and opportunities (Aulia et al., 2024); as a voluntary disclosure, it serves as a key channel through which energy companies convey their moral and social accountability for the carbon footprint of their operations.

Environmental Performance (moderating variable) refers to a company's ability to generate profit while maintaining regard for its environmental impact and fulfilling its environmental responsibilities (Oriska & Kusumawardani, 2024; Wahyuningrum et al., 2024). In the Indonesian context, environmental performance is formally assessed through PROPER (Program for Pollution Control, Evaluation, and Rating), a government-administered rating ranging from gold (best) to black (worst) that reflects the extent to which a company manages its environmental impact responsibly; because participation in PROPER is closely tied to a company's real environmental conduct, this variable is theorized to strengthen or weaken the credibility of the signals conveyed through eco-efficiency and carbon emission disclosure.

Eco-efficiency reflects a company's efficiency in using resources while reducing negative environmental impact. Marini & Vinola Herawaty (2024) and Santoso & Yanti (2024) find that eco-efficiency has a positive effect on firm value, as companies that implement eco-efficiency are often perceived as more innovative and socially responsible, thereby attracting investor attention and enhancing firm value. However, Yuliandhari et al. (2023a) find no such effect among high-profile industries, suggesting that investors in certain industries may prioritize direct profitability over environmental efforts. Consistent with signalling theory, the implementation of eco-efficiency is expected to convey a positive signal to the market regarding a company's environmental responsibility and operational efficiency, providing information investors need for their investment decisions and thereby increasing firm value.

H1: Eco-efficiency has a positive effect on Firm Value.

Carbon emission disclosure represents a form of transparency reflecting a company's responsibility toward climate change. Hardiyansah et al. (2021) and Nisa (2023) find that carbon emission disclosure has a significant positive effect on firm value, as it strengthens investor trust and corporate reputation, and Oriska & Kusumawardani (2024) similarly emphasize that transparency in carbon disclosure is important for attracting stakeholders. However, Rochmah (2022) and Gayatri (2024) find no significant effect, possibly due to low disclosure levels or investors not yet fully valuing this information. From a signalling theory perspective, carbon emission disclosure is expected to send a positive signal to investors that a company is concerned about environmental and sustainability issues, thereby reducing information asymmetry, increasing investor confidence, and lowering investment risk.

H2: Carbon emission disclosure has a positive effect on Firm Value.

Environmental performance is often considered a key element that can strengthen the relationship between eco-efficiency and firm value. Under signalling theory, companies with strong environmental performance tend to send positive signals to stakeholders, demonstrating their commitment to sustainability; Ericho & Amin (2024) find that environmental performance plays an important role in moderating the relationship between eco-efficiency and firm value, as the combination of eco-efficiency strategies with strong environmental performance is capable of creating additional value for the company. When a company's environmental performance is consistent with its eco-efficiency practices, investors are expected to receive a more positive signal, thereby increasing firm value.

H3: Environmental performance strengthens the effect of Eco-efficiency on Firm Value.

Carbon emission disclosure is an important strategy reflecting a company's transparency in addressing environmental issues, and environmental performance is expected to strengthen this relationship by lending additional credibility to the information disclosed. Rahmanita (2020a) finds that environmental performance moderates the relationship between carbon emission disclosure and firm value, as companies with strong environmental performance tend to be valued more highly by the market given their perceived greater responsibility toward environmental issues; this view is supported by Hardiyansah et al. (2021), who likewise find that environmental performance can strengthen the positive effect of carbon emission disclosure on firm value. Strong environmental performance demonstrates a company's commitment to global environmental standards, which can increase investor trust in its sustainability policies and reinforce the positive signal the company conveys to the market, thereby further enhancing firm value when environmental performance supports carbon emission disclosure.

H4: Environmental performance strengthens the effect of Carbon emission disclosure on Firm Value.

Research Method

This study employs a quantitative method, with the population consisting of all energy sector companies listed on the IDX during 2021-2024. The sample was determined using a purposive sampling technique based on the following criteria: (1) listed on the IDX during 2021-2024; (2) possessing complete financial statements, annual reports, and sustainability reports; and (3) participating in the PROPER program throughout the observation period. Secondary data were obtained from the official IDX website (www.idx.co.id) and each company's official website.

Table 1. Variable Measurement

Variable	Proxy / Measurement
Firm Value (FV)	Tobin's Q = (MVE + Total Debt) / Total Assets
Eco-efficiency (ECO)	Index of 8 disclosure items in the annual report (scored 1/0), $\sum X_j / N$
Carbon Emission Disclosure (CED)	Index of 5 categories and 18 carbon-emission disclosure indicators, $(\sum \text{items disclosed} / \sum \text{items}) \times 100\%$
Environmental Performance (EP)	PROPER rating (Gold=5, Green=4, Blue=3, Red=2, Black=1)

Data were analyzed using panel data regression with a Moderated Regression Analysis (MRA) approach to test the moderating role of environmental performance (Ghozali & Ratmono, 2017a). The regression equation used in this study is as follows:

$$FV = \alpha + \beta_1 ECO + \beta_2 CED + \beta_3 ECO * EP + \beta_4 CED * EP + \beta_5 FS + \varepsilon$$

Where: FV = Firm Value; α = constant; ECO = Eco-efficiency; CED = Carbon emission disclosure; EP = Environmental Performance; FS = Firm Size; β_1 -5 = regression coefficients; ε = error term. Model selection tests (Chow, Hausman), classical assumption tests (normality, multicollinearity, heteroscedasticity, autocorrelation), and hypothesis tests (coefficient of determination, F-test, and t-test) were conducted using EViews 12.

Result and Discussion

Table 2. Coefficient of Determination Test Result

Indicator	Value
R-squared	0.7936
Adjusted R-squared	0.6767

The Adjusted R-squared value of 0.6767 indicates that eco-efficiency, carbon emission disclosure, their interactions with environmental performance, and firm size jointly explain 67.67% of the variation in firm value, while the remaining variation is explained by other variables outside the model.

Table 3. F- Test Result

Indicator	Value
F-statistic	6.785
Prob(F-statistic)	0.000

The F-statistic probability value of 0.000 (< 0.05) indicates that the regression model used is fit to simultaneously explain the effect of the independent variables on firm value.

Table 4. t- Test Result

Variable	Coefficient	t-Statistic	Prob.
C	76.890	6.998	0.000
ECO	-5.587	-0.901	0.375
CED	20.097	2.467	0.020
ECO*EP	1.685	0.963	0.344
CED*EP	-4.700	-2.163	0.039
FS	-2.834	-7.485	0.000

Effect of Eco-efficiency on Firm Value (H1). The probability value for ECO of 0.375 (> 0.05) indicates that eco-efficiency has no significant effect on firm value; thus, H1 is rejected. Logically, this suggests that the market does not yet treat a company's internal eco-efficiency initiatives as a decisive signal in the sense

envisioned by signalling theory: because eco-efficiency indicators are self-reported within the annual report and are not verified by an independent external body, investors may find it difficult to distinguish genuine efficiency gains from symbolic disclosure, weakening the credibility of the signal. Furthermore, since eco-efficiency chiefly affects operational cost structures rather than a firm's reported earnings or cash flow in the short run, investors evaluating energy companies over a four-year window may simply be prioritizing more directly observable financial indicators over environmental efficiency claims. This finding is consistent with Yuliandhari et al. (2023) and Rafael & Lastanti (2025), who concluded that the implementation of eco-efficiency is not necessarily regarded by investors as an important indicator in valuing a company.

Effect of Carbon Emission Disclosure on Firm Value (H2). The probability value for CED of 0.020 (< 0.05) with a positive coefficient indicates that carbon emission disclosure has a significant positive effect on firm value; thus, H2 is accepted. This result is logically coherent because carbon emission disclosure, unlike eco-efficiency, is guided by structured external reporting frameworks (such as the GRI and IFRS S1/S2) and is often cross-referenced against a firm's sustainability report, giving investors a more standardized and verifiable basis for judgment; a company that discloses its emissions more completely is therefore seen as reducing information asymmetry rather than merely claiming environmental responsibility. In the energy sector specifically, where carbon exposure is a material financial and regulatory risk, comprehensive disclosure signals that management is proactively managing this risk, which investors are willing to reward with a higher valuation. This finding aligns with signalling theory and with studies by Dewi & Budiadnyani (2024), Rahmanita (2020a), and Yuliandhari et al. (2023) — the higher the level of carbon emission disclosure, the greater investor confidence in the company.

Moderating Role of Environmental Performance on Eco-efficiency (H3). The ECO*EP interaction has a probability value of 0.344 (> 0.05), indicating that environmental performance is unable to moderate the effect of eco-efficiency on firm value; thus, H3 is rejected. This is logically consistent with the rejection of H1: since eco-efficiency itself carries no significant signal to investors, adding a strong PROPER rating on top of it does not meaningfully change how the market interprets that signal, because the underlying eco-efficiency information was not being used as a valuation input in the first place — a moderator cannot strengthen a relationship that is not present to begin with. This result is consistent with Sutjiati et al. (2025), who attribute it to the still-inadequate standards and transparency in corporate environmental performance reporting.

Moderating Role of Environmental Performance on Carbon Emission Disclosure (H4). The CED*EP interaction has a probability value of 0.039 (< 0.05) with a negative coefficient (-4.700), meaning environmental performance actually weakens the positive effect of carbon emission disclosure on firm value; H4 is therefore rejected in its hypothesized direction. A plausible logical explanation is that when a company already holds a strong PROPER rating, additional carbon emission disclosure may be perceived by investors as incremental or even redundant information, since the environmental performance rating already conveys much of what the disclosure is meant to signal — in effect, the marginal informational value of carbon disclosure diminishes once environmental performance is independently verified as strong, dampening rather than reinforcing its positive effect on firm value. This finding reinforces Damas et al. (2021a) and Rahmanita (2020a), suggesting that the PROPER rating has not yet become a primary consideration for investors relative to carbon emission disclosure itself.

Effect of Firm Size on Firm Value. The control variable FS shows a significant negative effect (prob. 0.000) on firm value. Logically, this indicates that, within this sample, a larger asset base does not automatically translate into greater investor confidence; large energy companies often carry correspondingly large liabilities, capital-intensive legacy assets, and slower growth trajectories, which can depress the market-to-book valuation captured by Tobin's Q even as their absolute asset size grows. This suggests that investors are evaluating asset efficiency and quality of management rather than sheer scale, consistent with Pradanimas & Sucipto (2022) and Fajriah et al. (2022) — a large total asset base is not always accompanied by optimal management, and therefore does not necessarily enhance investor confidence.

Conclusion

Based on the results and discussion presented above, this study concludes that eco-efficiency has no significant effect on firm value, indicating that the market does not yet regard a company's internal eco-efficiency initiatives as a credible or decisive valuation signal. Carbon emission disclosure, by contrast, has a significant positive effect on firm value, reflecting the greater weight investors place on standardized, externally referenced environmental reporting when assessing energy sector companies. With respect to the moderating role of environmental performance, the results show that environmental performance does not moderate the effect of eco-efficiency on firm value, which is logically consistent with the absence of a direct eco-efficiency effect to begin with, while environmental performance actually weakens the positive effect of carbon emission disclosure on firm value, suggesting that a strong PROPER rating may render additional carbon disclosure informationally redundant in the eyes of investors rather than reinforcing it. Taken together, these findings indicate that among the sustainability-related variables examined, carbon emission disclosure is

the most consistent and credible driver of firm value in the energy sector, whereas eco-efficiency and environmental performance play a more limited or even offsetting role.

This study is limited by its focus on a single sector (energy), a relatively short observation period (2021-2024), and a limited sample size, as participation in the PROPER program remains voluntary. Future research is recommended to broaden sector coverage, extend the observation period, and incorporate additional variables to obtain more comprehensive results.

References

- Agustiningsih, W., & Septiani, N. D. (2022). Pengaruh ukuran perusahaan, leverage, dan profitabilitas terhadap nilai perusahaan. *Fair Value: Jurnal Ilmiah Akuntansi Dan Keuangan*, 5(3), 1433-1440. <https://doi.org/10.32670/fairvalue.v5i3.2465>
- Anggraeni, L. (2024). Pengaruh Carbon Emission Disclosure, Carbon Performance, Green Accounting, & Intellectual Capital Terhadap Nilai Perusahaan. 4(2).
- Aulia, A. M., Safitri, U. N. C., & Hwihanus, H. (2024). The Impact of Carbon Emission Disclosure on Firm Value. *Journal of Environmental Economics and Sustainability*, 1(3), 1-6. <https://doi.org/10.47134/jees.v1i3.354>
- Bongsoikrama, J., Andini, P., Riyadi, S., & Wulandari, A. A. (2024). Kontribusi Penerapan Good Corporate Governance Dan Eco-Efficiency Terhadap Nilai Perusahaan Dengan Kinerja Keuangan Sebagai Pemoderasi. *Jesya*, 7(1), 1029-1036. <https://doi.org/10.36778/jesya.v7i1.1512>
- Brigham, E. F., & Houston, J. F. (2014). *Dasar-dasar Manajemen Keuangan* (11th ed.). Salemba Empat.
- Budiarti, D., Kinasih, H. W., Pratiwi, R. D., & Prajanto, A. (2024). Pengaruh Struktur Aset, Profitabilitas dan Ukuran Perusahaan terhadap Struktur Modal. *Jurnal Maneksi*, 13(1), 145-155. <https://doi.org/10.31959/jm.v13i1.2038>
- Damas, D., Maghviroh, R. EL, & Meidiyah, M. (2021a). Pengaruh Eco-Efficiency, Green Inovation Dan Carbon Emission Disclosure Terhadap Nilai Perusahaan Dengan Kinerja Lingkungan Sebagai Moderasi. *Jurnal Magister Akuntansi Trisakti*, 8(2), 85-108. <https://doi.org/10.25105/jmat.v8i2.9742>
- Dewi, P. P. R. A., & Agustina, P. A. A. (2023). Ukuran Perusahaan, Leverage, Kinerja Perusahaan Dan Carbon Emission Disclosure. *Jurnal Ilmiah Manajemen, Ekonomi, & Akuntansi (MEA)*, 7(3), 667-680. <https://doi.org/10.31955/mea.v7i3.3383>
- Dewi, P., & Budiadnyani, N. P. (2024). Carbon emission disclosure, ukuran perusahaan, profitabilitas dan leverage: Nilai perusahaan. *Jurnal Ilmiah Manajemen*. <https://journal.stiemb.ac.id/index.php/mea/article/view/3921>
- Emalia, D., & Shauki, E. R. (2023). Analisa Krisis Legitimasi dan Pembangunan Berkelanjutan PT Pelindo Bengkulu akibat Konflik Lahan dengan Masyarakat. *Owner*, 7(2), 1612-1623. <https://doi.org/10.33395/owner.v7i2.1399>
- Ericho, M. F., & Amin, M. N. (2024). The Influence of Carbon Emission Disclosure Green Intellectual Capital and Environmental Performance on Firm Value With Moderation of Firm Size. *Quantitative Economics and Management*, 5(4).
- Fajriah, A. L., Idris, A., & Nadhiroh, U. (2022). Pengaruh Pertumbuhan Penjualan, Pertumbuhan Perusahaan, Dan Ukuran Perusahaan Terhadap Nilai Perusahaan. *Jurnal Ilmiah Manajemen Dan Bisnis*, 7(1), 1-12. <https://doi.org/10.38043/jimb.v7i1.3218>
- Gayatri, N. A. A. (2024). Pengaruh Carbon Emission Disclosure, Pengungkapan Green Accounting, Kinerja Lingkungan dan Ukuran Perusahaan terhadap Nilai Perusahaan Pada Indeks Saham LQ45 Tahun 2018-2022. 15, 356-370.
- Ghozali, I., & Ratmono, D. (2017a). Analisis multivariat dan ekonometrika: Teori, konsep, dan aplikasi dengan eview 10.
- Hapsari, M. D. (2023). Analisis Penerapan Laporan Keberlanjutan (Sustainability Report) Terhadap Nilai Perusahaan. *AKUNTANSI* 45, 4(1), 65-72. <https://doi.org/10.30640/akuntansi45.v4i1.724>
- Hardiyansah, M., Agustini, A. T., & Purnamawati, I. (2021). The Effect of Carbon Emission Disclosure on Firm Value: Environmental Performance and Industrial Type. *Journal of Asian Finance, Economics and Business*, 8(1), 123-133. <https://doi.org/10.13106/jafeb.2021.vol8.no1.123>
- Kurnia, D. (2019). Pengaruh Profitabilitas, Kebijakan Dividen dan Harga Saham Terhadap Nilai Perusahaan Pada Perusahaan Manufaktur di Provinsi Banten yang Terdaftar di Bursa Efek Indonesia periode 2009-2016. *Jurnal Akuntansi: Kajian Ilmiah Akuntansi (JAK)*, 6(2), 178. <https://doi.org/10.30656/jak.v6i2.1433>

- Liu, Y. S., Zhou, X., Yang, J. H., Hoepner, A. G. F., & Kakabadse, N. (2023). Carbon emissions, carbon disclosure and organizational performance. *International Review of Financial Analysis*, 90, 102846. <https://doi.org/10.1016/j.irfa.2023.102846>
- Mansour, M., Al Zobi, M., Abu alim, S., Saleh, M. W. A., Marashdeh, Z., Marei, A., Alkhodary, D., Al-Nohood, S., & Lutfi, A. (2024). Eco-innovation and financial performance nexus: Does company size matter? *Journal of Open Innovation: Technology, Market, and Complexity*, 10(1), 100244. <https://doi.org/10.1016/j.joitmc.2024.100244>
- Marini, & Herawaty, V. (2024). Pengaruh Pengungkapan Emisi Karbon, Eco-Efficiency dan Pertumbuhan Penjualan terhadap Nilai Perusahaan dengan Profitabilitas sebagai Variabel Moderasi. *El-Mal: Jurnal Kajian Ekonomi & Bisnis Islam*, 5(8). <https://doi.org/10.47467/elmal.v5i8.3646>
- Marini, & Vinola Herawaty. (2024). Pengaruh Pengungkapan Emisi Karbon, Eco-Efficiency dan Pertumbuhan Penjualan terhadap Nilai Perusahaan dengan Profitabilitas sebagai Variabel Moderasi. *El-Mal: Jurnal Kajian Ekonomi & Bisnis Islam*, 5(8), 3670-3686. <https://doi.org/10.47467/elmal.v5i8.3646>
- Nisa, A. K. (2023). Effect of Carbon Emission Disclosure on Company Value with Environmental Performance as Moderating Variable in Non-Financial Companies Listed on the Indonesian Stock Exchange. *Journal Of Accounting*, 3(1), 28-40.
- Oriska, S., & Kusumawardani, N. (2024). The Impact of Carbon Emission Disclosure on Environmental Performance. *Jurnal Ilmiah Wahana Pendidikan*, 10(10), 681-693. <https://doi.org/10.5281/zenodo.12948519>
- Pradanimas, A., & Sucipto, A. (2022). Pengaruh Ukuran Perusahaan, Profitabilitas dan Leverage Terhadap Harga Saham dengan Nilai Perusahaan sebagai Variabel Intervening. *Briliant: Jurnal Riset Dan Konseptual*, 7(1), 93. <https://doi.org/10.28926/briliant.v7i1.788>
- Pratama, A. S., & Ainiyah, A. K. (2023). Pengaruh eco-efficiency, environmental performance dan good corporate governance terhadap firm value: Studi empiris. *Implementasi Manajemen & Kewirausahaan*, 3(1), 48-58. <https://doi.org/10.38156/imka.v3i1.174>
- Rafael, A., & Lastanti, H. S. (2025). Pengaruh Environmental, Social, Governance (ESG) Disclosure, Green Innovation, Dan Eco-Efficiency Terhadap Nilai Perusahaan. *As-Syirkah: Islamic Economic & Financial Journal*, 4(3), 543-554. <https://doi.org/10.56672/5hvp0820>
- Rahmanita, S. (2020a). Pengaruh Carbon Emission Disclosure Terhadap Nilai Perusahaan Dengan Kinerja Lingkungan Sebagai Variabel Pemoderasi. *Akuntansi: Jurnal Akuntansi Integratif*, 6(01), 54-71. <https://doi.org/10.29080/jai.v6i01.273>
- Rochmah, S. (2022). Pengaruh Carbon Emission Disclosure, Green Innovation, Financial Performance terhadap Firm Value di Mediasi oleh Sustainability Report pada Perusahaan Sektor Energi yang terdaftar di BEI periode 2019-2022. 13, 236-248.
- Rochman, I. Y. A., & Andayani, S. (2023). Teori Sinyal Dalam Anomali Window Dressing 2022 Dan Penurunan Risiko Kredit Macet Pada Subsektor Perbankan: Studi Kasus Isu Resesi 2023. *Akuntansi*, 2(3), 109-122. <https://doi.org/10.55606/akuntansi.v2i3.334>
- Sagala, D. R., & Kusumadewi, R. K. A. (2023). Pengaruh Kinerja Lingkungan Dan Pengungkapan Lingkungan Terhadap Nilai Perusahaan (Studi Empiris pada Perusahaan Sektor Energi dan Basic Materials yang Terdaftar di Bursa Efek Indonesia Tahun 2017-2021). *Diponegoro Journal of Accounting*, 12(4).
- Santoso, A. M. M., & Yanti, H. B. (2024). Analisis Pengaruh Eko Efisiensi, Inovasi Hijau, Pengungkapan Emisi Karbon, Dan Kinerja Lingkungan Terhadap Nilai Perusahaan Dengan Ukuran Perusahaan Sebagai Variabel Kontrol. *Jurnal Ekonomika Dan Bisnis (JEBS)*, 4(5), 679-692. <https://doi.org/10.47233/jebs.v4i5.1961>
- Saraswati, R., & Herawaty, V. (2019). Pengaruh Opini Audit, Penggantian Auditor, Profitabilitas, Solvabilitas Dan Likuiditas Terhadap Audit Report Delay Dengan Kepemilikan Manajerial Sebagai Moderasi. *PROSIDING SEMINAR NASIONAL CENDEKIAWAN*. <https://doi.org/10.25105/semnas.v0i0.5839>
- Septianingrum, R. (2022). The influence of eco-efficiency on firm value with funding structure as a moderating variable. *JAE (Jurnal Akuntansi Dan Ekonomi)*, 7(1), 82-94. <https://doi.org/10.29407/jae.v7i1.16165>
- Setiawan, A., & Wibowo, R. E. (2021). Pengaruh Tax Avoidance, Manajemen Laba, Komisaris Independen, Dan Komite Audit.
- Sugiyono. (2019). *Metode Penelitian, Kuantitatif Kualitatif dan R & D*. Penerbit Alfabeta.

-
- Sulistiawati, E., & Dirgantari, N. (2017). Analisis Pengaruh Penerapan Green Accounting Terhadap Profitabilitas Pada Perusahaan Pertambangan Yang Terdaftar Di Bursa Efek Indonesia. *Jurnal Reviu Akuntansi Dan Keuangan*, 6(1). <https://doi.org/10.22219/jrak.v6i1.5082>
- Sutjiati, R., Ekawati, E., & Sisdianto, E. (2025). Pengaruh Eco-Efficiency Terhadap Nilai Perusahaan Dimoderasi Oleh Kinerja Lingkungan Dalam Perspektif Ekonomi Islam. *Assets: Jurnal Ekonomi, Manajemen Dan Akuntansi*, 15(1), 38-53. <https://doi.org/10.24252/assets.v15i1.57361>
- Tanisa, D. V., & Maharani, N. K. (2024). Pengaruh Net Profit Margin, Debt To Equity Ratio, Dan Firm Size Terhadap Harga Saham. *Jurnal Ilmiah Manajemen, Ekonomi, & Akuntansi (MEA)*, 8(1), 2362-2380. <https://doi.org/10.31955/mea.v8i1.3934>
- Tonay, C., & Murwaningsari, E. (2022). Pengaruh Green Innovation dan Green Intellectual Capital terhadap Nilai Perusahaan dengan Ukuran Perusahaan sebagai Moderasi. *Jurnal Bisnis Dan Akuntansi*, 24(2), 283-294.
- Wahyuningrum, I. F. S., Ihlashul'amal, M., Utami, S., Djajadikerta, H. G., & Sriningsih, S. (2024). Determinants of carbon emission disclosure and the moderating role of environmental performance. *Cogent Business and Management*, 11(1). <https://doi.org/10.1080/23311975.2023.2300518>
- Yuliandhari, W. S., Saraswati, R. S., & Rasid Safari, Z. M. (2023). Pengaruh Carbon Emission Disclosure, Eco-Efficiency dan Green Innovation Terhadap Nilai Perusahaan. *Owner*, 7(2), 1526-1539. <https://doi.org/10.33395/owner.v7i2.1301>