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The Effect of ESG Disclosure, Efficiency, and Liquidity on Banking Performance Listed on the Indonesia Stock Exchange for the 2021-2025 Period

Nasavia Daeng Lompang[1*], Joy Elly Tulung[2], Debry Chrystie Alexandra Lintong[3]

[1,2,3]Faculty of Economics and Business, Universitas Sam Ratulangi, Bahu, Malalayang, Manado City, North Sulawesi
viadaenglompang@gmail.com

Abstract

This study aimed to examine the effects of ESG Disclosure, Efficiency (BOPO), and Liquidity (LDR) on Banking Performance (ROA) of banking companies listed on the Indonesia Stock Exchange during the 2021-2025 period. A quantitative approach with a purposive sampling technique was employed, yielding a sample of 18 banking companies with a total of 90 panel data observations. Data were analyzed using panel data regression with a Robust Random Effect Model (REM) in STATA 17. Partial test results showed that ESG Disclosure had no significant effect on Banking Performance (H1 rejected), Efficiency had a significant negative effect on Banking Performance (H2 accepted), while Liquidity had no significant effect on Banking Performance (H3 rejected). Simultaneously, the three independent variables significantly affected Banking Performance (H4 accepted), with an Overall R-squared value of 88.95%, indicating strong explanatory power. These findings suggest that operational efficiency was the primary determinant of bank profitability compared to ESG disclosure and liquidity, implying that bank management should prioritize operational cost control to sustain profitabilityliquidity, implying that bank management should prioritize operational cost control to sustain profitability.
Keywords: ESG Disclosure, Efficiency, Liquidity, Banking Performance, Panel Data Regression

Abstrak

Penelitian ini bertujuan menguji pengaruh ESG Disclosure, Efisiensi (BOPO), dan Likuiditas (LDR) terhadap Kinerja Perbankan (ROA) pada perusahaan perbankan yang terdaftar di Bursa Efek Indonesia periode 2021-2025. Penelitian menggunakan pendekatan kuantitatif dengan teknik purposive sampling, sehingga diperoleh sampel 18 perusahaan perbankan dengan total 90 observasi data panel. Teknik analisis data yang digunakan adalah regresi data panel dengan model Robust Random Effect Model (REM) menggunakan aplikasi STATA 17. Hasil pengujian secara parsial menunjukkan bahwa ESG Disclosure tidak berpengaruh signifikan terhadap Kinerja Perbankan (H1 ditolak), Efisiensi berpengaruh negatif dan signifikan terhadap Kinerja Perbankan (H2 diterima), sedangkan Likuiditas tidak berpengaruh signifikan terhadap Kinerja Perbankan (H3 ditolak). Adapun hasil pengujian secara simultan menunjukkan bahwa ketiga variabel independen berpengaruh signifikan terhadap Kinerja Perbankan (H4 diterima), dengan nilai Overall R-squared sebesar 88,95%, yang menunjukkan daya penjelas yang sangat kuat. Temuan ini mengindikasikan bahwa efisiensi operasional merupakan determinan utama profitabilitas perbankan dibandingkan pengungkapan ESG maupun likuiditas, sehingga manajemen bank disarankan memprioritaskan pengendalian biaya operasional guna mendorong profitabilitas yang berkelanjutan.
Kata Kunci: ESG Disclosure, Efisiensi, Likuiditas, Kinerja Perbankan, Regresi Data Panel

✉ Corresponding author: Nasavia Daeng Lompang
Email Address: bayupptngn13@gmail.com (Bahu, Malalayang, Manado City, North Sulawesi)
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INTRODUCTION

The banking sector holds a strategic role as the backbone of the national economy through its function as a financial intermediary that collects public funds and channels them in the form of credit (Law No. 10 of 1998 on Banking). The failure of a single major bank has the potential to trigger a domino effect on the stability of the national financial system, making a bank's ability to maintain profitability as reflected in Return on Assets (ROA) the most critical indicator observed by investors, regulators, and the public.

However, the paradigm for assessing banking performance is now shifting fundamentally. Global investors are demanding comprehensive transparency regarding the management of environmental, social, and governance impacts. The Global Sustainable Investment Alliance (GSIA, 2022) recorded that global Environmental, Social, and Governance (ESG)-based assets had surpassed USD 35.3 trillion, or 36% of total professionally managed assets worldwide. This momentum has been reinforced by domestic regulation: POJK No. 51/POJK.03/2017, which mandates periodic sustainability reporting; SEOJK No. 16/SEOJK.04/2021, which establishes its technical standards; up to the GRI Standards 2021, effective as of January 1, 2023 (GRI, 2021). Based on Signaling Theory (Spence, 1973; Connelly et al., 2024), high-quality ESG disclosure functions as a credibility signal that reduces information asymmetry between management and investors. Operational efficiency (BOPO) has a direct mechanical relationship with net income, while liquidity (LDR) reflects the principle of prudential banking in maintaining a balance between intermediation and operational stability (Elnahass et al., 2022).

Empirical data from 18 sample banks on the IDX for the 2021-2025 period instead show a dynamic that is more complex than theory predicts. Average ROA moved from 1.78% (2021), rising to its peak of 2.10% (2023), then correcting to 1.90% (2025), while average ESG Disclosure actually increased by 60.3% over the same period, from 26.94 items (2021) to 42.67 items (2024). This paradox is further reinforced by findings at the individual bank level: BBCA, whose ESG Disclosure rose from 22 to 34 items, instead recorded consistently growing ROA of up to 3.90% (2025), whereas BDMN, whose ESG Disclosure fell from 42 items (2023) to 15 items (2025), experienced significant ROA pressure. This opposing pattern indicates that the relationship between ESG and ROA is not a simple linear relationship, but is instead conditioned by other variables that have not been simultaneously controlled for particularly efficiency (BOPO) and liquidity (LDR) given that a bank increasing its ESG budget without tight control over operating costs will face BOPO pressure that mechanically erodes ROA. The 2021-2025 period was selected because it fully captures the transitional cycle of Indonesian banking ESG standards, from the pre-GRI Standards 2021 era (2021-2022), the transition period (2023), to full implementation (2024-2025), coinciding with the post-pandemic economic recovery phase and the strengthening of OJK's Phase II sustainable finance roadmap (OJK, 2021), thereby making this period a research window with substantive novelty.

Inconsistencies in prior research further reinforce this urgency. Prasetyo and Musmini (2025) found that ESG had a significant positive effect on ROA, Sulaiman et al. (2026) found no significant effect, while Nareswari et al. (2023) found a significant negative effect. Mufitasari et al. (2025) and Adhim and Mulyati (2024) found that BOPO had a significant negative effect, whereas Pondaag et al. (2022) found no significant effect; meanwhile LDR was found to have a positive effect by Mufitasari et al. (2025), a significant negative effect by Gazi et al. (2022), and no significant effect by Pratama (2021). More importantly, no prior study has tested these three variables simultaneously within a single research model studies combining ESG-BOPO (Prasetyo & Musmini, 2025) did not include LDR, while

those combining BOPO-LDR (Mufitasari et al., 2025) did not include ESG, so each potentially contains omitted variable bias.

There is also a methodological gap: the majority of prior studies used SPSS-based OLS regression, which is unable to control for unobserved heterogeneity between banks, even though the range of ROA across banks in this study's sample is extremely wide, reaching up to 129.7 times between BBCA (3.90%) and MAYA (0.03%) in 2025 (Baltagi, 2021; Wooldridge, 2020). Panel data regression with systematic model selection through the Chow, Hausman, and Lagrange Multiplier tests is a more appropriate approach for capturing heterogeneity of this magnitude (Firdaus, 2020).

Banking performance in this study is measured using ROA, not ROE, because ROA reflects the effectiveness of management in optimizing total assets more comprehensively, is neutral to differences in capital structure across banks, and is officially used by OJK and Bank Indonesia as a profitability indicator within the RGEC framework. Based on the description above, this study aims to examine and analyze the effect of ESG Disclosure, Efficiency (BOPO), and Liquidity (LDR), both partially and simultaneously, on Banking Performance (ROA) at banking companies listed on the Indonesia Stock Exchange for the 2021-2025 period, in order to fill the model and methodological gaps that remain unanswered in the Indonesian banking literature.

METHOD

This study uses a quantitative approach with an associative research type, which aims to examine the causal relationship between ESG Disclosure (X1), Efficiency/BOPO (X2), and Liquidity/LDR (X3) on Banking Performance/ROA (Y) (Sekaran & Bougie, 2020). The object of the research is banking companies listed on the Indonesia Stock Exchange (IDX), with data sourced from the official IDX website (idx.co.id) and the official websites of each bank. The research was conducted in 2026, with the data observation period covering 2021-2025.

The research population consists of all banking companies listed on the IDX, totaling 48 companies as of 2025 (IDX, 2025). The sample was determined using a purposive sampling technique, namely sample selection based on specific criteria to ensure relevance to the research objectives (Sekaran & Bougie, 2020). The criteria used were: (1) consecutively listed on the IDX and not delisted during 2021-2025; (2) publishing complete and consecutive annual financial reports; (3) consistently publishing GRI-standard sustainability reports; (4) not experiencing losses or reporting positive net income throughout the period; and (5) operating on conventional principles and reporting LDR in their financial statements. The elimination process resulted in 18 banks meeting all criteria, with a total of 90 panel observations (18 banks × 5 years).

The data used is secondary data, collected through the documentation method from the annual reports and sustainability reports of the sample banks during 2021-2025, published through idx.co.id and each company's official website (Creswell & Creswell, 2018).

Table 1. Operational Definitions of Variables

Variable	Measurement
ESG Disclosure (X1)	Disclosure index of 80 GRI 2021 items (GRI 300 = 31 items, GRI 400 = 36 items, GRI 2 = 13 items), dichotomous score 1/0 divided by total items × 100%
Efficiency/BOPO (X2)	Operating Expenses ÷ Operating Income × 100%
Liquidity/LDR (X3)	Total Loans Disbursed ÷ Total Third-Party Funds × 100%
Banking Performance/ ROA (Y)	Profit Before Tax ÷ Total Assets × 100%

The three ESG dimensions (Environmental, Social, Governance) are treated as a single composite index in accordance with Signaling and Stakeholder Theory, which views the quality of sustainability disclosure holistically, while also avoiding potential multicollinearity between dimensions originating from the same company and period (Connelly et al., 2024; Gujarati & Porter, 2009).

The data were analyzed using panel data regression with STATA 17, because the data structure combines 18 cross-section units and 5 years of time series (Baltagi, 2021). The analysis began with descriptive statistics (mean, maximum, minimum, standard deviation) for the four variables. Model selection was carried out in stages: the Chow Test to select between the Common Effect Model (CEM) and the Fixed Effect Model (FEM); if FEM was selected, this was followed by the Hausman Test to select between FEM and the Random Effect Model (REM); if CEM was selected, this was followed by the Lagrange Multiplier Test to select between CEM and REM (Widarjono, 2018). The panel data regression model is formulated as:

$$ROA_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 BOPO_{it} + \beta_3 LDR_{it} + \varepsilon_{it}$$

After the model was selected, assumption tests were conducted, including multicollinearity (Variance Inflation Factor, VIF < 10) and heteroskedasticity (Modified Wald Test for FEM or Breusch-Pagan Test for REM). If heteroskedasticity and/or autocorrelation were detected, estimation used cluster-robust standard errors (clustered by bank) as an extension of the Huber-White sandwich estimator (Huber, 1967; White, 1980), which accommodates residual correlation across time within the same bank unit. Hypothesis testing was carried out through a partial test (t-test) to examine the effect of each independent variable on ROA, and a simultaneous test (F-test) to examine the combined effect of the three variables, with the coefficient of determination (Overall R-squared) used to measure the model's explanatory power for variation in Banking Performance.

RESULTS AND DISCUSSION

Descriptive statistics from 90 observations (18 banks × 5 years, 2021-2025 period) show substantial variation across all variables:

Table 2. Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
ROA (Y)	0.0197 (1.97%)	0.0114	0.0003 (0.03%)	0.0431 (4.31%)
ESG Disclosure (X1)	0.4546 (45.46%)	0.2097	0.1125 (11.25%)	0.8750 (87.50%)
BOPO (X2)	0.7583 (75.83%)	0.1364	0.4160 (41.60%)	0.9959 (99.59%)
LDR (X3)	0.8514 (85.14%)	0.1635	0.5138 (51.38%)	1.4700 (147%)

Source: STATA 17

The average ROA (1.97%) is relatively low compared to Bank Indonesia's "very good" standard (>1.5%, although still above it), with a standard deviation that is large relative to the mean, indicating a wide profitability gap between banks, in line with the also-wide range of BOPO (41.60%-99.59%). The average BOPO and LDR remain within the healthy category according to Bank Indonesia standards (BOPO < 94%; LDR 78-92%), but the very wide range of ESG Disclosure (a difference of 76.25 percentage points) indicates a significant sustainability transparency gap among the sample banks.

Model selection was carried out in stages. The Chow Test produced F(17,69) = 43.78 (Prob = 0.0000), pointing toward the Fixed Effect Model (FEM). The Hausman Test, as the final determining test, produced chi2(3) = 1.87 (Prob = 0.6007 > 0.05), so the Random Effect Model (REM) was selected. The Lagrange Multiplier Test confirmed this with chibar2(01) = 137.54 (Prob = 0.0000), rejecting the Common Effect Model. The difference in direction between the Chow Test (pointing to FEM) and the Hausman/LM Tests (pointing to REM) is not a methodological contradiction — the Hausman Test remains the final determinant, economically supported by the sample characteristics: the 18 banks are a subset of the broader population of conventional banks on the IDX, so bank-specific individual effects (organizational culture, historical reputation) can be assumed to be random and not systematically correlated with the independent variables.

The assumption tests show the model is free of multicollinearity (Mean VIF = 1.08; all VIF < 10), but heteroskedasticity was detected (Breusch-Pagan: Chi2(1) = 44.88; Prob = 0.0000) as well as first-order autocorrelation (Wooldridge Test: F(1,17) = 6.991; Prob = 0.0170). Because both assumption violations occurred simultaneously, cluster-robust standard errors per bank were used as an extension of the Huber-White sandwich estimator, so the final model is the Robust Random Effect Model.

Table 3. Regression Results and Hypothesis Testing

Variable	Coefficient	Robust Std. Err.	z	P>|z|
ESG Disclosure (X1)	0.0000373	0.0014870	0.03	0.980
BOPO (X2)	-0.0871973	0.0042284	-20.62	0.000
LDR (X3)	0.0037288	0.0019978	1.87	0.062
Constant	0.0826452	0.0041312	20.00	0.000

Source: STATA 17

Regression equation: ROA = 0.0826 + 0.0000ESG − 0.0872BOPO + 0.0037LDR.

Partially: ESG Disclosure has no significant effect (p = 0.980; H1 rejected); BOPO has a significant negative effect (p = 0.000; H2 accepted), with |z| = 20.62 far exceeding the other two variables; LDR is not significant at α = 5% (p = 0.062; H3 rejected), but falls below the 10% threshold. Simultaneously, Wald chi2(3) = 435.50 (Prob = 0.0000) shows that the three variables jointly have a significant effect (H4 accepted).

The coefficient of determination shows Within R^2 = 0.9295, Between R^2 = 0.8851, and Overall R^2 = 0.8895 meaning 92.95% of the variation in ROA within a single bank over time, and 88.51% of the difference in average ROA between banks, can be explained by this model overall, the model

explains 88.95% of the variation in Banking Performance, which is classified as very strong for banking finance research.

ESG Disclosure on ROA. This insignificant result is consistent with Signaling Theory (Spence, 1973): signal effectiveness depends on credibility and market acceptance (signal reception), which appears not to have been optimally met in the Indonesian capital market during this transition period. In the context of developing countries, ESG implementation in its early phase tends to generate short-term cost burdens (report preparation, independent assurance, human resource training) that are felt more dominantly than its long-term benefits (improved reputation, reduced cost of capital), which are only realized as the market ecosystem and domestic investor ESG literacy mature. The wide transparency gap between banks (11.25%-87.50%) also makes it difficult for the market to interpret ESG as a uniform signal large banks with more adequate capital and human resources tend to disclose more comprehensively, while small banks face capacity limitations. This finding is in line with Sulaiman et al. (2026), but differs from Prasetyo and Musmini (2025) and Lina et al. (2024), who found a significant positive effect, likely due to differences in period, ESG score measurement method, and sample composition.

Efficiency (BOPO) on ROA. This significant negative effect reflects a mechanical-accounting relationship, not an agency issue: net income as the main component of ROA is obtained from the difference between revenue and operating expenses, so a decrease in BOPO automatically increases ROA. This relationship is nearly deterministic because both ratios derive from the same components of the income statement, explaining why the |z| for BOPO (20.62) far exceeds that of both ESG and LDR. This phenomenon is also related to the wave of digital transformation in Indonesian banking: banks that succeed in reducing BOPO are generally more progressive in digital infrastructure investment, thereby reducing dependence on physical branch networks that burden operating costs. This result is consistent with Mufitasari et al. (2025) and Adhim and Mulyati (2024), confirming cost efficiency as a direct quantitative determinant of profitability, not merely a qualitative governance indicator.

Liquidity (LDR) on ROA. This insignificant result at $\alpha = 5\%$ is in line with the Good Corporate Governance perspective the very wide LDR range (51.38%-147%, even exceeding 100%) reflects diverse liquidity strategies during the post-pandemic recovery phase, from very conservative to very aggressive, neither of which consistently produced higher ROA. However, the p-value of 0.062, which lies just above the 5% threshold but below 10%, can be described as marginal evidence: an early signal that increased liquidity tends to be positively associated with profitability, although not yet strong enough to be concluded definitively at the standard confidence level. This finding is in line with Pratama (2021), but differs from Mufitasari et al. (2025), who found a significant positive effect, likely because post-pandemic liquidity dynamics (2021-2025) differ from those of a more stable period.

Simultaneous Effect. This significant result supports Signaling Theory in that the combination of sustainability signals (ESG), managerial efficiency (BOPO), and intermediation optimization (LDR) collectively shapes market perception of a bank although representing different dimensions, the three

complement one another in shaping profitability. The high Overall R^2 value (88.95%) needs to be interpreted carefully: it is dominantly driven by the explanatory power of BOPO (z = -20.62), not an even contribution from all three variables a logical consequence of the direct accounting relationship between BOPO and ROA, not an indication of overfitting, given that the model has been confirmed free of multicollinearity (Mean VIF = 1.08). This result is in line with Pratama (2021) and Pondaag et al. (2022), which demonstrated that internal bank factors simultaneously have a significant effect on the profitability of Indonesian banks.

CONCLUSION

This study finds that, partially, ESG Disclosure has no significant effect on Banking Performance/ROA (H1 rejected), indicating that during the transition period of GRI Standards 2021 implementation, the Indonesian capital market has not yet fully integrated ESG disclosure as a signal that directly affects bank profitability. Efficiency (BOPO) has a negative and significant effect (H2 accepted), with a z-value (-20.62) far exceeding the other variables, confirming BOPO as the strongest and most consistent determinant of banking performance. Liquidity (LDR) shows marginal evidence in a positive direction (p = 0.062), so H3 is formally rejected at the 95% confidence level, reflecting that the diverse liquidity management strategies among banks during the post-pandemic recovery phase have not yet produced a pattern consistent enough to be declared significant. Simultaneously, the three variables have a significant effect on Banking Performance (H4 accepted), with an Overall R-squared of 88.95%, confirming that the research model is suitable for explaining the dynamics of Indonesian banking profitability.

These findings recommend that bank management make operational cost control a top strategic priority through business process optimization and accelerated digital transformation, while also directing ESG implementation toward improving the quality and consistency of reporting not merely the quantity of disclosure so that sustainability signals carry substance that can be verified by the market. For regulators, strengthening systemic efficiency (banking consolidation, expansion of financial technology) and independent verification standards for sustainability reports needs to continue to be encouraged. Future research is recommended to extend the observation period beyond the full implementation of GRI Standards 2021, add moderating variables such as firm size or capital adequacy (CAR), and consider ESG scores from independent rating agencies to improve the objectivity of results.

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