A PANEL DATA PERSPECTIVE ON TRIPLE BOTTOM LINE IMPLEMENTATION AND FINANCIAL PERFORMANCE OF INDONESIA'S STATE-OWNED BANKS (2020-2024)

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ABSTRACT

This study investigates how adopting a Triple Bottom Line (TBL) framework influences the financial performance of Indonesian state-owned banks. Drawing on Stakeholder and Signaling Theories, the research treats the Planet and People dimensions of TBL as indicators of management quality and organizational resilience. Using a quantitative panel data approach covering four major state-owned banks — Bank Mandiri, BNI, BRI, and BTN — across 2020 to 2024, the study generates 20 observations. The Planet dimension is measured through the Green Financing Ratio (GFR), while Social Disclosure Intensity (SDI) derived from a 40-item GRI 400-series checklist, captures the People dimension. Return on Assets (ROA) is used as the primary performance measure, with bank size and Non-Performing Loans (NPL) included as control variables. Analysis was conducted using Linear Mixed Models in IBM SPSS 29, with an AR(1) covariance structure to address serial correlation within banks.
The results reveal that GFR has a modest positive but statistically insignificant relationship with ROA, while SDI shows virtually no effect, resulting in both hypotheses being rejected. Importantly, neither TBL variable harmed profitability, countering the notion that sustainability practices come at a financial cost. The high autocorrelation detected suggests that bank-specific historical performance is the dominant driver of ROA, potentially masking any short-term effects of TBL. Overall, the findings position TBL adoption as financially neutral at worst and modestly beneficial at best, with fuller profitability gains likely emerging over longer periods — offering practical guidance for sustainable resource planning in line with OJK's Sustainable Finance Roadmap Phase II.

Keywords: Triple Bottom Line, Stakeholder Theory, Financial Performance, Sustainable Finance, Financial Resilience

1. INTRODUCTION

The global financial landscape is undergoing a paradigm shift where traditional profit-maximization models are no longer sufficient to ensure long-term corporate survival. This research explores the strategic evolution of the Indonesian banking sector as it moves toward sustainable value creation. The 2020 global pandemic served as a critical "enlightenment" period, forcing financial institutions to recognize that social capital and environmental resilience are not merely ethical choices but essential components of financial stability.

In the Indonesian context, this shift is formalized through the Financial Services Authority (OJK) Sustainable Finance Roadmap Phase II, which mandates systemic banks to integrate Environmental, Social, and Governance (ESG) principles into their core business operations. While the regulatory pressure is clear, a persistent debate remains regarding the "financial trade-off" of these initiatives. Critics often argue that diverting resources toward the Triple

Bottom Line (TBL)—specifically the "Planet" and "People" pillars—may incur high operational costs that could temporarily depress profitability.

However, drawing on Stakeholder and Signaling Theories, this study proposes that TBL implementation acts as a powerful proxy for management quality. By prioritizing green credit allocation and social empowerment, banks signal their organizational risk resilience to investors and regulators alike. This research addresses a critical gap by providing empirical evidence from Indonesia's four state-owned banks (Mandiri, BNI, BRI, and BTN) from 2020 through 2024.

The primary objective of this study is to determine whether Triple Bottom Line engagement—measured through the Green Financing Ratio and Social Disclosure Intensity—increases or decreases the Return on Assets (ROA) of these systemic banks. By focusing on ROA as a benchmark of operational efficiency, this study aims to provide managerial guidance for bank leaders in strategic resource allocation, ensuring that profitability is sustained through long-term resilience rather than short-term leverage.

2. LITERATURE REVIEW

Aligned with Stakeholder and Signaling Theories, this research analyses that "Planet" and "People" initiatives serve as indicators of management quality and contribute to risk reduction. Recent studies (Pardosi & Fathihani, 2025; Sutisna, 2025) demonstrate a significant correlation between ESG integration, earnings quality, and financial resilience.

2.1. Stakeholder Theory and Signaling Theory

This study is grounded in two complementary theoretical frameworks: Stakeholde Theory and Signaling Theory. Freeman (1984) first proposed Stakeholder Theory, arguing that a firm's long-term success depends on its ability to identify, manage, and satisfy the needs of all stakeholders, including shareholders, employees, customers, regulators, and the broader community—rather than maximizing shareholder value alone. In the context of banking, this theory explains why state-owned banks that allocate resources toward environmental and social initiatives are likely to generate stronger financial performance over time: such investments build trust, reduce regulatory friction, and secure the loyalty of a broader base of depositors and borrowers (Maryantia et al., 2024; Manurung et al., 2024).

2.2. Triple Bottom Line Framework in Banking

Elkington (1997) introduced the Triple Bottom Line (TBL) framework as an approach to measuring corporate performance across three dimensions: economic (Profit), social (People), and environmental (Planet). In the banking industry, TBL implementation translates into the integration of sustainability principles into core lending and reporting activities. The OJK Sustainable Finance Roadmap Phase II (2021–2025) has formalized this requirement for Indonesian banks, mandating the progressive adoption of sustainable finance instruments across the banking system (OJK, 2023).

Recent Indonesian studies confirm that TBL implementation in state-owned banks creates measurable effects on financial outcomes. Ramadhani and Hidayati (2024) examined TBL application at Bank Rakyat Indonesia (BRI) and found positive contributions of People and

Planet dimensions to financial performance. Pardosi and Fathihani (2025) similarly demonstrated a significant positive relationship between green banking practices and earnings quality for conventional Indonesian banks during 2020–2024.

At the international level, Jovita (2023) found that ESG implementation positively influenced financial performance and capital structure in Indonesian-listed companies, while Shafitranata, Alvia, and Azizah (2026) confirmed a positive ESG–financial performance relationship specifically for green companies in Indonesia. The preponderance of evidence suggests that TBL integration is not merely a compliance exercise but a viable financial strategy, particularly during periods of systemic economic shock such as the COVID-19 pandemic.

2.3. Green Financing Ratio (Planet Dimension) and Bank Financial Performance

The Green Financing Ratio—defined as the proportion of total green loans to total loans outstanding—is the primary proxy for the Planet dimension of TBL in this study. An expanding body of literature demonstrates a positive link between green credit allocation and bank profitability. Lian, Gao, and Ye (2022) used panel data from Chinese commercial banks and found, through a fixed-effect model, that green credit significantly improves both ROA and Net Interest Margin (NIM). This positive effect was amplified in regions with higher levels of green development, suggesting that context moderates the green finance–profitability nexus. Khuc et al. (2025), examining ASEAN banks from 2019 to 2023, similarly found that both the green credit ratio and green disclosure practices have a positive, if modest, impact on financial performance.

In the Indonesian context, Fikri and Zaenal (2024) studied the impact of green credit distribution on Indonesian bank performance using panel data. They found that green credit allocation does not negatively affect profitability, while Andaiyani, Muthia, and Novriansa (2023) confirmed positive performance effects in a sample of Indonesian banks. Consistent with Stakeholder Theory, banks with higher green financing ratios attract stakeholders who prioritise environmental responsibility, thereby strengthening depositor confidence and borrower relationships, which in turn stabilize credit quality and reduce non-performing loans (Gutierre-Ponce & Wibowo, 2023; Lian et al., 2022).

Not all findings are uniformly positive, however. Some studies, including Sun et al. (2025) using Chinese bank data, report a short-term suppressive effect of the green credit ratio on ROA, attributing this to the longer investment horizons of green projects and higher compliance costs. Galán and Tan (2024) similarly found a negative effect of green credit on bank efficiency. These different findings underscore the importance of the institutional context and time horizon in the green finance–performance relationship. In the Indonesian state-owned bank context, where government mandates and regulatory incentives align green lending with portfolio quality targets, the expected direction of the relationship remains positive.

Based on the foregoing, this study posits:
H_1: Green Financing Ratio has a significant and positive effect on the Return on Assets (ROA) of Indonesian state-owned banks.

2.4. Social Disclosure Intensity (People Dimension) and Bank Financial Performance

Social Disclosure Intensity (SDI), the second independent variable in this study, is measured as the ratio of social items actually disclosed to the total expected social items under the GRI 400-series framework. This content-analysis-based index captures the breadth of a bank's voluntary social reporting, encompassing employment practices, health and safety, training and development, community engagement, anti-corruption, and customer privacy.

The relationship between social disclosure and financial performance has been extensively studied in both international and Indonesian contexts. Mutakin and Mihret (2018) and subsequent work confirmed that CSR disclosure positively influences bank profitability as measured by ROA and ROE. More recently, Fiana and Endri (2025), using panel data from Indonesian commercial banks, found that CSR positively affects ROA, indicating that greater disclosure of CSR activities in annual reports correlates with higher financial performance. Prihandini (2025) found that larger Indonesian state-owned banks exhibit more structured and comprehensive ESG disclosures, and that ESG disclosure levels align with external ESG rankings on the IDX, supporting the Signaling Theory proposition that high-quality disclosure is associated with superior operational performance.

At the international level, studies of Vietnamese commercial banks (Le & Nguyen, 2022) and banks in the GCC Islamic banking sector (Mallin et al., 2014) found significant positive relationships between CSR disclosure indices and bank profitability. These findings are consistent with Stakeholder Theory: banks that invest in and credibly communicate their social performance build institutional legitimacy, attract patient capital, and reduce the cost of regulatory compliance. Conversely, Yoon, Lee, and Cho (2024) found a negative relationship between the social pillar of ESG and ROA in Korean firms, suggesting that the magnitude and direction of the relationship are context-dependent and may vary by market maturity and regulatory environment.

In the Indonesian state-owned bank context, social disclosure during the COVID-19 pandemic (2020–2021) served a particularly critical stabilizing function, as banks with established social capital and community engagement were better positioned to manage loan restructuring and demonstrate compliance with emergency regulatory frameworks (Pardosi & Fathihani, 2025; Tjahyono et al., 2025). This supports the view that pandemic-period SDI acts as a signal of resilient governance, contributing to superior financial outcomes in subsequent periods.

Based on the previous literature, this study suggests:
H_2: Social Disclosure Intensity has a significant and positive effect on the Return on Assets (ROA) of Indonesian state-owned banks.

2.5. Control Variables: Bank Size and Non-Performing Loans

Two control variables are incorporated to isolate the effect of TBL variables on ROA: BankSize and Non-Performing Loans (NPL). BankSize, proxied by the natural logarithm of total assets (Ln Total Assets), is a widely used control variable in banking profitability research. Larger banks typically benefit from economies of scale, greater diversification, and superior access to capital markets, all of which contribute positively to ROA (Tri Basuki & Rahman, 2024; Hanip & Ridha, 2025). However, several studies, including Galán and Tan (2024), report a negative relationship between bank size and return on assets (ROA) within the context of green credit. This finding indicates that larger state-owned banks may encounter greater policy burdens when implementing green finance mandates. Including BankSize as a control variable ensures that the estimated coefficients for Green Financing Ratio and Social Disclosure Intensity are not influenced by scale effects.

Non-Performing Loans (NPL) capture credit quality and serve as a key indicator of a bank's risk profile. Several empirical findings in the banking literature are that NPL is negatively associated with ROA: higher non-performing loans erode net interest income, increase provisioning requirements, and constrain capital allocation, thereby reducing profitability (Fiana & Endri, 2025; Taofiqurrochman et al., 2026; Sun et al., 2025). In the Indonesian banking context, studies, including those on Bank KBMI 3 and 4 (Tri Basuki & Rahman, 2024) confirm

the significantly negative relationship between NPL and ROA. Controlling for NPL is essential in this study because TBL engagement may improve credit quality by shifting portfolios toward lower-risk green and socially responsible borrowers, and this credit-quality channel must be distinguished from the direct effect of TBL variables on profitability.

2.6 Research Gap

Although researchers have separately explored how green finance and CSR disclosure each influence bank performance, very few studies have brought both dimensions together under a complete Triple Bottom Line (TBL) framework — one that simultaneously accounts for both environmental (Planet) and social (People) factors — using balanced panel data focused specifically on Indonesian state-owned banks. Most existing Indonesian studies tend to look at either environmental or social performance on its own or rely on broad ESG scores rather than using bank-specific measures like the Green Financing Ratio or a GRI-based Social Disclosure Index to capture what Planet and People truly mean in practice.

What makes this study particularly timely is its 2020–2024 timeframe, which covers the disruption of the COVID-19 pandemic and the subsequent recovery period. This window offers a rare opportunity to examine whether banks that stayed committed to TBL principles during a period of severe economic stress were ultimately able to maintain stronger financial performance. This question speaks directly about the goals of OJK's Sustainable Finance Roadmap Phase II. By addressing these overlooked gaps, this study delivers a focused, bank-level empirical analysis of how the full TBL framework relates to ROA across Indonesia's four state-owned banks over this critical five-year period.

3. RESEARCH METHOD

3.1. Population and Sample

The population in this study is 5 state-owned banks in Indonesia. The criteria for bank samples are (1) classified as a conventional state-owned commercial bank (Bank Umum Konvensional/BUK) under OJK's banking classification; (2) categorized as a BUKU 4 systemic bank throughout the 2020–2024 period; and (3) possessing complete, audited financial and sustainability data for all five observation years. Therefore, the samples in this study are Bank Mandiri, BNI, BRI and BTN.

Bank Syariah Indonesia (BSI) was explicitly excluded from this study despite its status as a state-owned bank. This exclusion is justified on the following methodological grounds:

- Incomplete Panel Data (2020–2024): BSI was legally established on February 1, 2021, as a result of the merger of BRI Syariah, BNI Syariah, and Mandiri Syariah. Consequently, BSI has no standalone financial data for 2020, the first observation period of this study. Including BSI would produce an unbalanced panel, violate the fundamental requirement of a balanced panel data design and render cross-bank comparisons unreliable for the full study period.

- Different Regulatory and Operational Framework: BSI operates under Islamic banking principles and is regulated under OJK Regulation No. 24/POJK.03/2018 concerning Islamic Commercial Banks, which differs fundamentally from the conventional banking regulatory framework (POJK No. 12/POJK.03/2021) governing Mandiri, BNI, BRI, and BTN. This regulatory divergence creates structural non-comparability in key financial indicators: BSI reports Non-Performing Financing (NPF) rather than

Non-Performing Loans (NPL); profit is derived from profit-sharing rather than interest income, thereby affecting ROA computation; and capital adequacy ratios are calculated under a different risk-weight framework.

- Non-Comparable Green Financing Ratio: The Green Financing Ratio, as the Planet proxy in this study, is measured based on the Sustainable Business Activity Category (KKUB) defined under POJK No. 51/POJK.03/2017, which was designed for conventional banking products. BSI's green financing instruments are structured as sharia-compliant products (e.g., green sukuk, musharakah-based renewable energy financing), which follow different classification criteria and are not directly equivalent to the KKUB-based measurement applied to conventional banks.

- Incomparable Social Disclosure Intensity: The Social Disclosure Intensity (SDI) in this study is measured using a 30-item GRI Standards social checklist aligned with POJK 51/2017. Unlike the other four banks, which follow the conventional GRI social reporting framework, BSI's sustainability disclosures reflect a distinctly Islamic perspective.

This approach is consistent with prior panel data studies on Indonesian banking (e.g., Pardosi & Fathihani, 2025; Mukti et al., 2025) that apply homogeneous sampling criteria when constructing comparative bank panels.

3.2. Operational Variables and Measurement

This study uses a balanced panel dataset comprising four Indonesian state-owned banks (Bank Mandiri, BNI, BRI, and BTN) observed annually over the period 2020 to 2024, yielding a total of 20 observations. Data was sourced from each bank's Annual Reports and Sustainability Reports. The dependent variable is Return on Assets (RoA), while the main independent variables are the Green Financing Ratio (GFR) and Social Disclosure Intensity (SDI). BankSize and NPL are included as control variables.

3.2.1. Dependent Variable

ROA (Return on Assets): Measured as Net Profit After Tax divided by Average Total Assets, expressed as a percentage. ROA is chosen as the dependent variable because it captures operational efficiency independently of leverage, making it the OJK-preferred benchmark for assessing bank intermediary function (OJK, 2016; Fiana & Endri, 2025).

Although Return on Equity (ROE) is widely used to measure shareholder returns, this study prioritizes Return on Assets (ROA) as the main indicator of financial performance, for three key reasons. First, because banks operate with high levels of leverage, ROE can be easily inflated by shifts in capital structure rather than genuine operational improvement. ROA, by contrast, offers a cleaner picture of how effectively management generates profit from the bank's total asset base. Second, state-owned banks often receive government capital injections and are subject to specific dividend policies, both of which can cause the equity denominator to fluctuate unpredictably — potentially distorting ROE-based comparisons across the panel data. Third, ROA is the benchmark preferred by the OJK (Indonesia's Financial Services Authority) when evaluating how well banks fulfil their intermediary role, making it the most contextually appropriate measure for this study. By focusing on the analysis in ROA, this research ensures that the observed influence of Triple Bottom Line variables reflects the bank's core

business and operational performance — rather than being shaped by financing decisions or leverage strategy.

3.2.2. Independent Variables

Green Financing Ratio (GFR) as the planet dimension, measured as Total Green Loans / Total Loans × 100%. Green loans are defined in accordance with OJK POJK No. 51/2017 sustainable finance categories (renewable energy, sustainable land use, clean transportation, green buildings, eco-efficient products, and sustainable water management). Data are extracted from the Sustainable Finance section of each bank's annual and sustainability reports.

Social Disclosure Intensity (SDI) as the people dimension, measured as the number of social items actually disclosed divided by the total expected social items under the GRI 400-series framework, multiplied by 100%. A 40-item GRI social disclosure checklist (GRI 401–418 and GRI 205) is applied through content analysis of each bank's annual report. Each item is scored 1 if fully disclosed, 0.5 if partially disclosed, and 0 if not disclosed. The checklist was constructed following the methodology established in prior literature (Mutakin & Mihret, 2018; Prihandini, 2025).

3.2.3. Control Variables

BankSize, measured as the natural logarithm of total assets (Ln Total Assets), is consistent with standard practice in the banking profitability literature (Hanip & Ridha, 2025; Tri Basuki & Rahman, 2024). Non-Performing Loans (NPL), measured as the Net NPL Ratio (%), is defined as total non-performing loans subtracted by loan loss provision, divided by total gross loans. Data are sourced from the financial highlights section of each bank's annual report.

3.3. Analytical Technique

Data analysis is conducted using IBM SPSS Statistics Version 29 via the Linear Mixed Models procedure, following a structured three-stage procedure to ensure the validity, reliability, and interpretive richness of the estimates. The LMM is specified with fixed effects for all four predictors and a random intercept for each bank, capturing unobserved, time-invariant bank-specific characteristics. The full model is expressed as follows:

$$RoA_{it} = \beta_0 + \beta_1 GFR_{it} + \beta_2 SDI_{it} + \beta_3 BankSize_{it} + \beta_4 NPL_{it} + u_i + \varepsilon_{it}$$

Where: β_1 and β_2 are the main coefficients of interest (GFR and SDI, respectively); β_3 and β_4 are control variable coefficients; u_i is the random intercept for each bank, capturing bank-specific baseline differences; and ε_{it} is the residual error with AR (1) covariance structure capturing time-based autocorrelation within banks.

3.4. Classical Assumption Test

Before regression estimation, a series of classical assumption tests were conducted to validate model integrity. (1) Normality test, (2) Multicollinearity test using Variance Inflation Factor (VIF) and Tolerance values, (3) Homoscedasticity test, (4) Autocorrelation test using the Durbin–Watson, (5) Linearity test and (6) Outlier. Hypothesis testing was conducted using Linear Mixed Model (LMM) with REML estimation and AR(1) covariance structure.

4. RESULTS AND DISCUSSION

4.1. Panel Data Set

Below is the table of data of dependent variable, independent variables and control variables from all 4 banks' sample, from the year of observation 2020-2024.

Table 1. Panel Dataset — Indonesian State-Owned Banks (2020–2024)

Bank	Year	RoA (%)	GFR (%)	SDI (%)	BankSize (ln)	NPL (%)
Bank Mandiri	2020	1.64	10.11	33.33	21.156	0.43
	2021	2.53	12.30	38.46	21.269	0.41
	2022	3.30	11.41	48.72	21.413	0.26
	2023	4.03	11.88	41.03	21.499	0.29
	2024	3.59	11.37	88.20	21.610	0.33
BNI	2020	0.50	5.33	20.51	20.608	0.90
	2021	1.40	9.51	28.21	20.687	0.70
	2022	2.50	9.25	41.03	20.753	0.50
	2023	2.60	9.77	71.79	20.807	0.60
	2024	2.50	9.46	79.49	20.845	0.70
BRI	2020	1.98	8.86	38.46	21.200	0.80
	2021	2.72	7.51	35.90	21.241	0.70
	2022	3.76	7.65	33.33	21.347	0.73
	2023	3.93	7.18	38.46	21.399	0.76
	2024	3.76	7.12	74.36	21.413	0.75
BTN	2020	0.69	5.51	53.75	19.705	2.06
	2021	0.81	5.60	48.75	19.733	1.20
	2022	1.02	6.69	50.00	19.812	1.32
	2023	1.07	6.88	51.25	19.898	1.32
	2024	0.83	7.41	52.50	19.967	1.89

Source: Bank Annual Reports & Sustainability Reports, 2020-2024 (compiled 2026)

4.2. Descriptive Statistics

Descriptive statistics were computed for all variables included in the model. The results are presented in Table 2. RoA ranged from 0.50% to 4.03%, reflecting substantial variation in profitability across banks and time periods. GFR ranged from 5.33% to 12.30%, while SDI showed considerable variation from 20.51% to 88.20%, indicating heterogeneous social disclosure practices among the four banks. BankSize ranged from 19.705 to 21.610 (ln total assets), and NPL ranged from 0.26% to 2.06%.

Table 2. Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max
RoA (%)	20	2.258	1.206	0.500	4.030
GFR (%)	20	8.540	2.167	5.330	12.300
SDI(%)	20	48.376	17.813	20.510	88.200
BankSize (ln)	20	20.818	0.654	19.705	21.610
NPL (%)	20	0.832	0.497	0.260	2.060

Source: Audited Financial Reports and Sustainable Reports 2020-2024 (SPSS29)

The descriptive statistics in Table 2 reveal considerable variation across the panel of four Indonesian state-owned banks over the 2020–2024 observation period. The panel mean RoA of 2.258% exceeds the OJK minimum profitability benchmark of 1.5%, suggesting that, on average, the sampled banks maintained adequate earnings performance throughout the study window. The range of RoA values is notable: the minimum of 0.50%—recorded by BNI in 2020—reflects the acute earnings compression experienced during the onset of the COVID-19 pandemic, while the maximum of 4.03%—recorded by Bank Mandiri in 2023—demonstrates that stronger performers achieved robust profitability once pandemic-era headwinds had subsided. The standard deviation of 1.206 percentage points—approximately half the mean—indicates that profitability recovery was uneven across the sample, with BTN consistently lagging behind other banks throughout the period. The average GFR across the panel stood at 8.540%, ranging from a low of 5.33% to a high of 12.30%, pointing to varying approaches to green portfolio development among the sampled institutions and a broadly increasing trajectory in green financing allocation over the observation period. SDI presents the widest relative dispersion of all variables, with a panel mean of 48.376% but a standard deviation of 17.813 percentage points and a range spanning from 20.51% to 88.20%, indicating that social disclosure practices under the GRI 400 framework were highly heterogeneous across banks—with Bank Mandiri's 2024 figure of 88.20% standing as a clear outlier driven by a significant expansion in sustainability reporting scope. BankSize, expressed as the natural logarithm of total assets, ranged narrowly from 19.705 to 21.610 with a mean of 20.818 and a standard deviation of only 0.654, reflecting the relatively comparable asset scales of the four state-owned banks, though BTN remained the smallest institution throughout the period. Finally, NPL averaged 0.832%, well below the OJK's 5% ceiling, with a maximum of 2.06% recorded by BTN—consistent with its higher-risk mortgage-focused lending portfolio—and a minimum of 0.26% recorded by Bank Mandiri, underscoring the divergence in credit quality management across institutions despite their shared state-ownership structure.

4.3. Correlation Matrix

A Pearson correlation analysis was conducted to examine the bivariate relationships among all variables before the main analysis. Results are presented in Table 3. GFR showed a significant positive correlation with RoA ($r = 0.542$, $p = 0.014$), providing preliminary support for H1. SDI showed a positive but non-significant correlation with RoA ($r = 0.254$, $p = 0.280$). BankSize was strongly and positively correlated with RoA ($r = 0.860$, $p < 0.001$), confirming its importance as a control variable. NPL showed a strong negative correlation with RoA ($r = -0.692$, $p < 0.001$), consistent with theoretical expectations. The highest inter-predictor correlation was observed between BankSize and NPL ($r = -0.847$), which was subsequently examined through multicollinearity diagnostics.

Table 3. Pearson Correlation Matrix

Correlations

		RoA	GFR	SDI	BankSize	NPL
RoA	Pearson Correlation	1	,542*	,254	,860**	-,692**
	Sig. (2-tailed)		,014	,280	<,001	<,001
	N	20	20	20	20	20
GFR	Pearson Correlation	,542*	1	,164	,648**	-,750**
	Sig. (2-tailed)	,014		,490	,002	<,001
	N	20	20	20	20	20
SDI	Pearson Correlation	,254	,164	1	,024	,018
	Sig. (2-tailed)	,280	,490		,921	,939
	N	20	20	20	20	20
BankSize	Pearson Correlation	,860**	,648**	,024	1	-,847**
	Sig. (2-tailed)	<,001	,002	,921		<,001
	N	20	20	20	20	20
NPL	Pearson Correlation	-,692**	-,750**	,018	-,847**	1
	Sig. (2-tailed)	<,001	<,001	,939	<,001	
	N	20	20	20	20	20

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

4.4. Classical Assumption Result

4.4.1. Multicollinearity Test

The multicollinearity test results in Table 4 show that all independent variables have Tolerance values greater than 0.10 and VIF values below 10, confirming no problematic linear relationships among the independent variables. These diagnostic outcomes collectively validate the appropriateness of the OLS regression framework for the current dataset.

Table 4. Multicollinearity Result

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-34,150	8,799		-3,881	,001		
	GFR	-,042	,101	-,075	-,413	,685	,405	2,468
	SDI	,016	,008	,243	2,014	,062	,923	1,083
	BankSize	1,724	,403	,934	4,274	<,001	,282	3,550
	NPL	,091	,622	,038	,147	,885	,205	4,881

a. Dependent Variable: RoA

4.4.2. Normality Test

The normality test yielded an Asymptotic Significance (2-tailed) for both Kolmogorov-Smirnov and Shapiro-Wilk tests, exceeding the 0.05 threshold, confirming that the model residuals follow a normal distribution.

Table 5. Normality Test Result

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Unstandardized Residual	,112	20	,200*	,973	20	,818

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

4.4.3. Homoscedasticity Test

The Levene's Test for homoscedasticity yielded F(3, 16) = 1.302 with a p-value of .308, which exceeds the .05 significance threshold. This indicates a failure to reject the null hypothesis of equal variances, confirming that the residual variances are homogeneous across the four banks. In other words, the spread of RoA values does not differ systematically for all samples, satisfying the equal variance assumption required for reliable regression-based inference.

Table 6. Homoscedasticity Test Result

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Unstandardized Residual	Based on Mean	1,302	3	16	,308
	Based on Median	,994	3	16	,421
	Based on Median and with adjusted df	,994	3	13,277	,426
	Based on trimmed mean	1,315	3	16	,304

4.4.4. Autocorrelation Test

The Durbin-Watson statistics of 1.340 (Table 7) falls within the inconclusive region (dL = 1.5, dU = 2.5) for n = 20 and k = 4. The Runs Test yielded an asymptotic significance value of 0.491 (Table 8), which exceeds the 0.05 significance threshold, indicating a failure to reject the null hypothesis of no autocorrelation. Based on the combined results of both tests, it is concluded that the regression model is free from autocorrelation, thereby satisfying the classical assumption.

Table 7. Durbin-Watson Test Result

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,893[a]	,798	,744	,61024	1,340

a. Predictors: (Constant), NPL, SDI, GFR, BankSize

b. Dependent Variable: RoA

Table 8. Run Test Result

Runs Test

	Unstandardized Residual
Test Value[a]	,00990
Cases < Test Value	10
Cases >= Test Value	10
Total Cases	20
Number of Runs	9
Z	-,689
Asymp. Sig. (2-tailed)	,491

a. Median

Runs Test 2

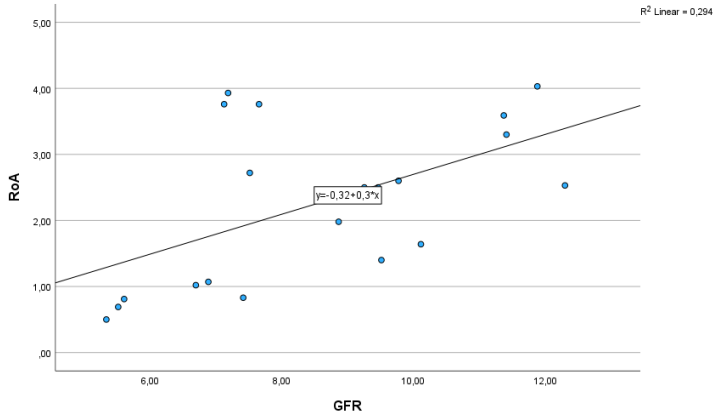
	Unstandardized Residual
Test Value[a]	,0000000
Cases < Test Value	10
Cases >= Test Value	10
Total Cases	20
Number of Runs	9
Z	-,689
Asymp. Sig. (2-tailed)	,491

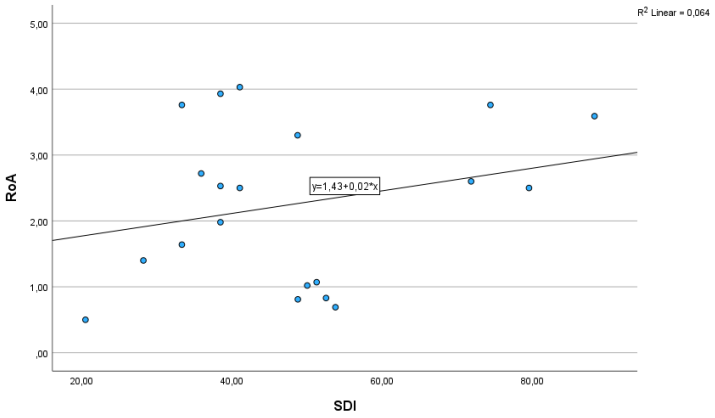
a. Mean

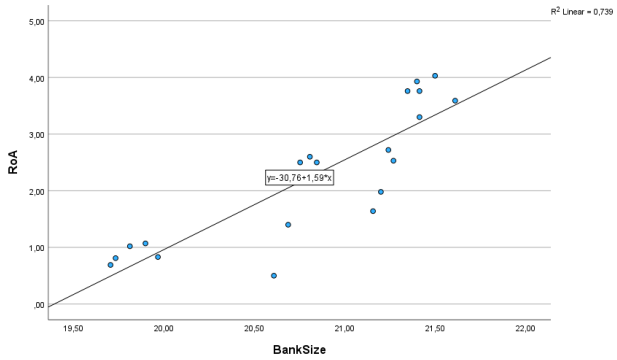
4.4.5. Linearity Test

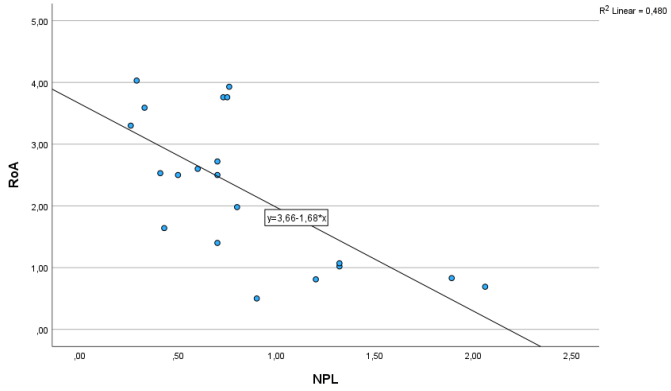
This test checks whether each predictor variable has a linear relationship with the outcome variable (Return on Assets / RoA), which is a core assumption of linear regression. A scatter plot of each predictor against RoA was examined, with a fit line overlaid. The R^2 value indicates how much of the variation in RoA is explained by each predictor individually. All four predictors (GFR, SDI, BankSize, NPL) are linearly related to RoA. The linearity assumption of the regression model is met, and no transformation of variables is required.

Table 9. Linearity Test Result









4.4.6. Outlier Test

This test checks whether any data points are extreme outliers that could disproportionately distort or skew the regression model's results. Two measures were used together: Cook's Distance and Standardized Residuals. Cook's Distance measures how much the overall regression results would change if a particular observation were removed. The highest Cook's Distance value in the dataset was 0.489, which is well below the commonly accepted cutoff of 1.0. Standardized Residuals (ZRE) measure how far each observation's actual value deviates from the model's predicted value, expressed in standard deviation units. Both Cook's Distance and Standardized Residuals are within acceptable limits, indicating that all observations are behaving consistently with the model.

Table 10. Outlier Test Result

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Cook's Distance	20	,00001	,48888	,0652491	,11215027
Standardized Residual	20	-1,76574	1,48878	,0000000	,88852332
Valid N (listwise)	20				

4.5. Linear Mixed Model Result

The estimates of fixed effects represent the relationship between each predictor and RoA, controlling for all other variables in the model. Results are presented in Table 11. Neither GFR (β = 0.102, p = .341) nor SDI (β = -0.001, p = .901) showed a statistically significant effect on RoA, which resulted in the rejection of both H_1 and H_2. The control variables BankSize (β = 1.606, p = .222) and NPL (β = -0.287, p = .569) were also non-significant, though their directions were consistent with theoretical expectations.

Table 11. Estimates of Fixed Effects Result

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	-31,929	16,812	1,590	-1,899	,230	-125,422	61,564
GFR	,102	,103	12,550	,991	,341	-,121	,325
SDI	-,001	,008	13,256	-,126	,901	-,018	,016
BankSize	1,606	,814	1,561	1,973	,222	-3,031	6,244
NPL	-,287	,486	9,311	-,591	,569	-1,381	,807

a. Dependent Variable: RoA.

From the analysis conducted, the formula is as follows:

$$RoAi = (-31.929) + 0.102\ GFR - 0.001\ 2SDI + 1.606\ Bank\ Size - 0.287\ NPL + u_i + \varepsilon_{it}$$

The formula implies that (1) when all independent variables are zero, the baseline RoA (Return on Assets) is -31.929, suggesting banks would be deeply unprofitable in the absence of any of these factors, (2) a one-unit increase in GFR (likely a growth or financing ratio) is associated with a +0.102 increase in RoA, implying that higher GFR slightly improves bank profitability, (3) a one-unit increase in SDI is associated with a -0.001 decrease in RoA. For BankSize and NPL as the control variables, they are controlled so that the effects of GFR and SDI are not biased by bank size and credit quality differences.

4.6. Estimates of Covariance Parameter

The covariance parameter estimates confirm the appropriateness of the AR(1) repeated structure. The AR1 rho (ρ = 0.864, p < .001) indicates strong and statistically significant first-order autocorrelation within banks across time, validating the choice of the AR(1) covariance structure. The random intercept variance estimate of 0.000 indicates that after accounting for the AR(1) serial correlation, no additional between-bank variance remained unexplained by the fixed effects, which is consistent with the small number of groups (4 banks).

Table 12. Estimates of Covariance Parameter Result

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Repeated Measures	AR1 diagonal	1,055	1,522	,693	,488	,062	17,836
	AR1 rho	,864	,231	3,732	<,001	-,445	,996

a. Dependent Variable: RoA.

4.7. Effect of GFR on RoA

The results show that GFR has an estimate of +0.102, which is in the correct positive direction as hypothesized. However, the significance value is p = 0.341, which is far above the conventional threshold of $p < 0.05$ (or even $p < 0.10$). This means the effect of GFR on ROA is statistically insignificant, and therefore H_1 is rejected. Although the positive coefficient suggests a directional alignment with the hypothesis, the relationship is too weak and unreliable to be considered statistically meaningful. This may reflect the fact that green financing portfolios in Indonesian state-owned banks are still at a relatively early stage of development, and their contribution to profitability has not yet been statistically measurable during the observed period. This finding is consistent with Fata and Arifin (2024), who found that green credit distribution negatively affects ROA in Indonesian banks, and with Rachman and Saudi (2021), who reported a negligible negative effect of green finance on ROA in emerging economies. The positive coefficient direction, while not statistically significant, aligns with Putri et al. (2022), who found a positive relationship between green banking and ROA in nine Indonesian banks over 2010–2020. The non-significance may reflect the relatively short observation window (5 years), transition costs associated with green portfolio development, and the fact that green financing impacts may manifest over longer time horizons than captured in this study.

4.8. Effect of SDI on RoA

The virtually zero and non-significant coefficient of SDI on RoA ($\beta = -0.001$, $p = .901$) suggests that social disclosure intensity, as measured by GRI 400 series items, does not directly affect bank profitability in the short term. This finding aligns with a substantial body of literature. Gutierrez-Ponce et al. (2024) found that ESG practices, including social disclosure, negatively affect ROA in Southeast Asian banks due to increased short-term costs. Listiawaty et al (2025) similarly found that the direct effect of sustainability disclosure on bank performance in ASEAN countries is not significant, with the effect being mediated through bank risk reduction rather than directly improving profitability. These findings suggest that social disclosure represents a compliance and reputational investment whose financial benefits may accrue over longer periods or through indirect channels not captured by ROA alone.

5. Conclusion

This study examined whether Triple Bottom Line (TBL) implementation — operationalized through the Green Financing Ratio (GFR) as the Planet dimension and Social Disclosure Intensity (SDI) as the People dimension — has a statistically significant effect on the Return on Assets (ROA) of Indonesia's four state-owned banks (Bank Mandiri, BNI, BRI, and BTN) over the 2020–2024 period. Using a balanced panel dataset of 20 observations and a Linear Mixed Model (LMM) with an AR(1) covariance structure estimated via SPSS 29, the empirical results led to the rejection of both H_1 and H_2.

These findings do not invalidate the strategic value of TBL for Indonesian state-owned banks; rather, they underscore the temporal complexity of the sustainability–profitability relationship. The positive directional sign of GFR is broadly consistent with the growing body of Indonesian literature linking green credit to financial performance (Andaiyani et al., 2023; Putri et al., 2022), while the non-significance of SDI aligns with studies demonstrating that social disclosure creates value primarily through indirect pathways — such as reduced credit risk, enhanced regulatory compliance, and stronger stakeholder trust — rather than through a direct, contemporaneous boost to ROA (Listiawaty et al., 2025; Gutierrez-Ponce et al., 2024). The 2020–2024 observation window, which encompassed the acute shock of the COVID-19 pandemic, may have compressed the financial signal of TBL variables as banks prioritized credit restructuring and capital preservation over the optimization of sustainability portfolios.

This study is subject to several limitations that should be acknowledged. First, the sample is restricted to four banks over five years, yielding only 20 observations — a constraint that limits statistical power and may prevent the detection of effects that are real but modest in magnitude. Future research should extend the panel to include a broader range of Indonesian commercial banks and a longer time horizon to capture the full accumulation of TBL benefits. Second, the study measures TBL impact solely through ROA; incorporating complementary performance indicators such as Return on Equity (ROE), Net Interest Margin (NIM), or Tobin's Q would provide a more comprehensive picture of TBL's financial effects. Third, the direct-effect model employed here does not account for potential mediating or moderating variables — such as credit risk reduction, deposit growth, or regulatory capital ratios — that may be the primary channels through which TBL engagement ultimately affects profitability. Future studies employing structural equation modelling or causal mediation analysis could shed light on these indirect pathways.

This study contributes to the growing body of empirical evidence on sustainable banking in Indonesia by providing a focused bank-level panel data analysis of how the full TBL framework relates to ROA over a critical five-year period that spanned an economic crisis and recovery. The results affirm that TBL implementation, consistent with Stakeholder and Signalling Theories, represents a strategically sound commitment that preserves financial performance while building the institutional foundations for long-term resilience. As Indonesia's sustainable finance architecture continues to evolve under OJK's Roadmap Phase II, this study offers policymakers and bank leaders evidence-based assurance that Planet and People investments need not come at the expense of Profit — and may, over time, prove essential to it.

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