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Do Investors Value Green Practices or Green Disclosure? Evidence from Listed Indonesian Banks with Islamic Operations

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Abstract

Purpose: This study examines whether substantive green practice, green disclosure, and profitability are associated with the market value of listed Indonesian banks that conduct Islamic banking over 2022–2025. The study captures green practice with green investment (GI), green disclosure with a green banking disclosure index (GBD), and profitability with return on assets (ROA). The study is motivated by declining market valuations amid expanding sustainable finance regulation and mixed prior evidence.
Methodology: The study uses an explanatory, non-experimental panel design. The sample comprises 12 banks listed on the Indonesia Stock Exchange (IDX) that conduct Islamic banking, four Islamic commercial banks (BUS) and eight conventional banks that operate an Islamic business unit (UUS), over 2022–2025 (48 bank-year observations). All variables are measured at the listed-bank level and used unrounded. Firm value is Tobin's Q, GI is sustainable-category financing scaled by total assets, and GBD is a 21-item index. Random effects and fixed effects models are estimated with bank-clustered standard errors, t (G − 1) critical values, and wild cluster bootstrap p-values. Additional specifications include firm size, a UUS indicator, year effects, lagged regressors, leverage, an alternative valuation measure, and the exclusion of highly valued digital banks.
Findings: No association between GI and firm value is distinguishable from zero in any specification. The coefficient on GBD is negative in most specifications, reaches the 5% level only in one fixed effects specification, and is close to zero when two highly valued digital banks are excluded, so the hypothesized positive association is not supported. The association between ROA and firm value is unstable. It is negative in the full sample and positive when the two digital banks are excluded. The evidence therefore does not show that investors price either green practice or green disclosure in this sample. However, the small number of banks limits statistical power, and the design identifies associations, not effects.
Novelty: The study separates substantive green practice from green disclosure within one model for listed banks with Islamic operations, measures every variable at the level at which a market price exists, and reports inference suited to a small number of clusters. It thereby examines whether green banking disclosure remains value relevant once sustainability reporting is mandatory.

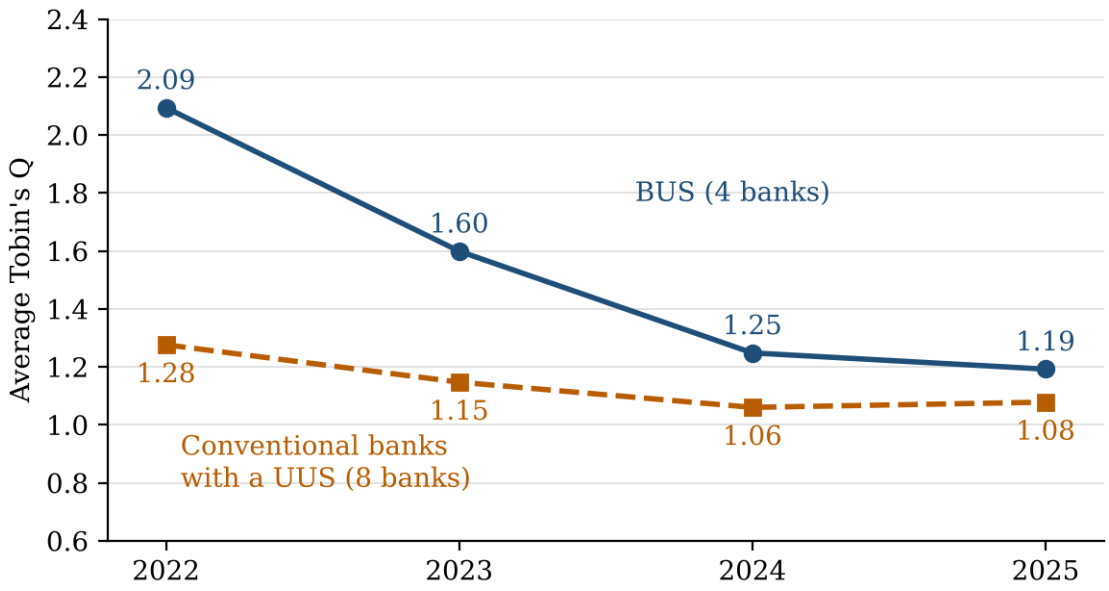
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Introduction

Climate change and economic volatility increasingly affect environmental stability and economic activity, including the financial sector (Astuti et al., 2025; Khairunnisa & Busra, 2025). Indonesia has responded through its Enhanced Nationally Determined Contribution, which reaffirms the target of net-zero emissions by 2060 or sooner (Republic of Indonesia, 2022; Soraya, 2023). Observed temperatures underline the relevance of this commitment. The Indonesian Agency for Meteorology, Climatology, and Geophysics reports a national mean temperature of 27.05°C in 2025, an anomaly of +0.38°C relative to the 1991–2020 normal of 26.7°C, which makes 2025 the sixth warmest year in the 1981–2025 record (Prasetyaningtyas, 2026).

Indonesia has also built a regulatory framework for sustainable finance. Regulation POJK 51/POJK.03/2017 requires financial services institutions, including banks, to prepare sustainable finance action plans and to publish sustainability reports (Otoritas Jasa Keuangan [OJK], 2017). OJK issued the Indonesian Green Taxonomy in 2022 and refined it in February 2024 as the Indonesian Taxonomy for Sustainable Finance (TKBI), which provides activity-level criteria for classifying sustainable financing (OJK, 2022, 2024). The policy question has therefore shifted from whether a definitional framework exists to whether the market distinguishes banks that commit resources to green activities from banks that mainly report on them. Firm value, understood as a firm's market valuation relative to the book value of its assets or equity, is the relevant outcome because it summarizes investors' expectations about future cash flows and risk (Cynthia & Susanti, 2024). Figure 1 presents the average firm value of the sample entities over 2022–2025.



Source: Authors' calculation from the bank-level panel described in the Methodology (four BUS and eight conventional banks that operate a UUS).

Figure 1. Average Tobin's Q of the sample BUS and of the listed conventional banks that operate a UUS, 2022-2025

Average Tobin's Q declined for both groups between 2022 and 2025. The decline is steeper for the BUS, from 2.09 to 1.19, than for the conventional banks that operate a UUS, from 1.28 to 1.08. Bank Aladin Syariah drives the BUS average, with Tobin's Q falling from 4.68 to 1.74. Two cautions apply to this comparison. First, the second series is the valuation of conventional banks as a whole, not their Islamic units, because a UUS has no shares of its own. Second, the averages rest on four and eight banks and are sensitive to single observations. The level difference between the two series therefore does not show that the market values one group of Islamic operations more than the other. The figure does show

that market valuations weakened while sustainable finance obligations expanded, raising the question of whether green practice and green disclosure are reflected in firm value.

Islamic banks provide a distinct setting for this question. Their financing is, in principle, linked to real-sector transactions and is expected to serve the objectives of maqasid al-shariah, which contemporary interpretations extend to include environmental protection (Rosanty & Khoirurrizki, 2025; Sa'bandiyah et al., 2025). Green investment, understood as allocating a bank's funds to environmentally beneficial activities, is the substantive expression of this mandate (Mentari & Dewi, 2023; Suryaningprang, 2024).

Green banking disclosure, in contrast, is the reporting of a bank's environmental policies, programs, and activities (Firmansyah & Kartiko, 2024). Because such reporting is mandatory under POJK 51/POJK.03/2017, disclosure levels may converge across banks and carry limited information for investors, as Bose et al. (2018) document for Bangladeshi banks after the introduction of central bank guidance on green banking. Profitability, measured by return on assets (ROA), is considered another determinant of firm value because it captures current earnings performance (Yulianti, 2025).

Prior evidence on these relationships is mixed. Putri and Paramita (2025) and Lehan et al. (2025) report a positive association between green investment and firm value, and Hasanah and Paramita (2025) report a positive association for profitability. For green banking disclosure, Dananjaya and Dewi (2025) and Hilleri et al. (2025) report positive associations, whereas Pratiwi et al. (2023) and Umbing et al. (2024) find no significant association.

International evidence adds two qualifications. First, the consequences of mandatory sustainability reporting depend on the performance that reporting reveals. Christensen et al. (2021) review the capital-market and real effects of reporting mandates and show that these effects depend on how a mandate is designed, implemented, and enforced. Grewal et al. (2019) document an average negative equity market reaction to the passage of the European Union directive on nonfinancial disclosure, with a less negative reaction for firms that already had stronger ESG performance and disclosure. Chen et al. (2018) find lower profitability among Chinese firms subject to a CSR reporting mandate, together with lower pollution in the cities most affected. Fatemi et al. (2018) report that ESG strengths are associated with higher firm value. In contrast, disclosure alone is associated with lower valuation and mainly moderates how strengths and weaknesses are valued. Second, evidence on Islamic banks focuses more on CSR disclosure than on environmental practice. Haniffa and Hudaib (2007) find a gap between the ethical identity that Islamic banks communicate and the identity expected under an Islamic ethical framework. Mallin et al. (2014) show that Islamic banks across 13 countries give the least attention to the environmental dimension of CSR disclosure, and their three-stage least squares estimate suggest that the association runs from financial performance to disclosure. Platonova et al. (2018) report a positive association between CSR disclosure and financial performance among GCC Islamic banks, and Julia and Kassim (2020) find that neither Islamic nor conventional banks in Bangladesh fully met green banking policy requirements. Together, this evidence suggests that investors may value the substance of disclosure rather than its extent. This distinction has rarely been tested for Islamic banks using market valuation.

Mixed findings alone do not constitute a research gap, and combining green variables with profitability is not new, as several studies have already estimated them jointly (Hasanah & Paramita, 2025; Putri & Rokhman, 2026; Rofiah & Komara, 2025). The gap addressed here is narrower. First, most of this evidence comes from non-financial firms or from SRI-KEHATI index constituents, which are selected for their sustainability commitment, and few studies examine Islamic banking entities. International studies of Islamic banks relate CSR disclosure mainly to accounting performance rather than to market valuation (Mallin et al., 2014; Platonova et al., 2018). Second, few studies distinguish within a single model between substantive green practice, which requires resource commitment, and green disclosure, which may be largely symbolic when reporting is mandatory (Clarkson et al., 2008). Third, the dual structure of Indonesian Islamic banking means the market value of a UUS can be

observed only through its conventional parent, a feature prior studies treat implicitly. This study therefore asks whether green investment, green banking disclosure, and profitability are associated with the market value of banks that conduct Islamic banking and are listed on the IDX over 2022–2025, and whether these associations differ between BUS and conventional banks that operate a UUS. It contributes evidence on the value relevance of green disclosure under a mandatory reporting regime and makes the measurement consequences of the BUS–UUS structure explicit.

Literature Review

Stakeholder Theory

Stakeholder theory holds that a firm's survival and value depend on its ability to meet the expectations of groups that affect or are affected by its activities, not only shareholders (Freeman, 1984). Gray et al. (1995) apply this view to corporate social and environmental reporting and argue that firms manage relationships with the stakeholders who control resources essential to their operations. For banks, these stakeholders include depositors, investment account holders, regulators, and borrowers. The theory predicts that observable responses to stakeholder expectations, such as allocating funds to environmentally beneficial activities, can strengthen stakeholder support and, through it, firm value. It does not by itself explain why disclosure, as distinct from practice, should affect market prices, which is why signalling theory is introduced below.

Signalling Theory and the Substance of Disclosure

Signalling theory explains how a better-informed party conveys unobservable quality to a less-informed party (Spence, 1973). A signal is credible when lower-quality firms find it costly or difficult to imitate (Connelly et al., 2011). Applied to sustainability, actual resource commitments are costly signals, whereas disclosure can be produced cheaply and may be discounted unless supported by substantive performance (Clarkson et al., 2008). This distinction yields different expectations for green investment and for green banking disclosure, particularly when disclosure is mandated and therefore less discretionary.

Resource-Based View

The resource-based view (RBV) holds that sustained competitive advantage arises from resources and capabilities that firms control internally (Wernerfelt, 1984). Barney (1991) specified the conditions under which resources generate such advantage: they are valuable, rare, imperfectly imitable, and non-substitutable, and later added that the firm must be organized to exploit them (Barney, 1995). In this study, the RBV helps explain why some banks achieve persistently higher profitability. However, the link between profitability and market value depends on how investors translate current earnings into expected future cash flows.

Firm Value

Firm value reflects investors' assessment of a firm's ability to generate future cash flows and is observed through share prices (Cynthia & Susanti, 2024). It is commonly measured by an approximation of Tobin's Q or by the price-to-book value ratio (Chung & Pruitt, 1994). In Islamic banking, firm value is also discussed normatively in relation to *maslahah*, that is, economic performance that is consistent with social and environmental responsibility (Halim & Suharsono, 2024). This normative view is distinct from the empirical question addressed here, which concerns how market participants value observable practices and outcomes (Nasihin et al., 2025).

Green Practice and Green Disclosure

This study distinguishes two dimensions of a bank's environmental orientation. Green investment is the allocation of financial resources to activities that preserve natural resources or reduce environmental harm (Rofiah & Komara, 2025). For a bank, the main channel is financing, which OJK classifies through the sustainable activity categories of its taxonomy (OJK, 2024). From an Islamic perspective, such allocation expresses the principle that investment should serve *maslahah* rather than profit alone. Green banking disclosure is the reporting of a bank's environmental policies, programs,

and performance (Claduri et al., 2025). It indicates transparency, but its content need not correspond to the scale of the underlying practice.

Financial Performance

Investors use profitability as an indicator of a firm's ability to use its assets productively and to sustain future earnings (Setyawan & Ghozali, 2025). In Islamic economics, profit is legitimate when earned within sharia constraints and balanced with social responsibilities (Khuriyah, 2025). This normative framing does not change the empirical expectation that higher profitability is associated with higher market valuation.

Hypothesis Development

Green Investment and Firm Value

Green investment commits a bank's funds to environmentally beneficial activities and is therefore a costly and observable response to stakeholder expectations (Wasyiah et al., 2025). Stakeholder theory implies that such commitment strengthens support from depositors, regulators, and investors, while signaling theory implies that its cost makes it a credible signal of long-term orientation (Connelly et al., 2011; Wijayanti & Budi, 2024). Green investment can also strengthen corporate reputation and business performance (Zhang & Berhe, 2022), and studies in non-financial and banking samples report positive associations with firm value (Lehan et al., 2025; Nurjannah et al., 2025; Putri & Paramita, 2025). Because green investment may involve upfront costs that reduce short-term earnings, a positive association is expected but not assured.

H1. Green investment is positively associated with firm value.

Green Banking Disclosure and Firm Value

Green banking disclosure reports a bank's environmental policies, programs, and activities (Romli & Zaputra, 2021). Signaling theory predicts that disclosure reduces information asymmetry and investors value it when it conveys information not otherwise available (Spence, 1973). Several Indonesian studies report a positive association between green banking disclosure and firm value (Dananjaya & Dewi, 2025; Hilleri et al., 2025; Qurrota et al., 2025). Because disclosure under POJK 51/POJK.03/2017 is mandatory and may converge across banks, its incremental information content may nonetheless be limited (Bose et al., 2018). International evidence on mandatory reporting likewise suggests that investors price the performance revealed by disclosure rather than disclosure as such (Fatemi et al., 2018; Grewal et al., 2019). The hypothesis follows the theoretical prediction, and the mandatory regime is treated as a reason why it may not be supported.

H2. Green banking disclosure is positively associated with firm value.

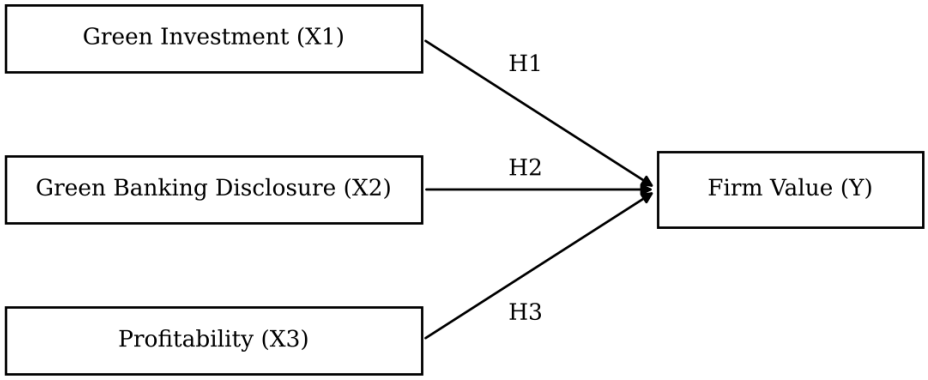
Profitability and Firm Value

Higher ROA indicates that a bank generates more earnings from its asset base, and investors capitalize current earnings into expectations of future cash flows (Setyawan & Ghozali, 2025). Higher profitability can also signal managerial efficiency in deploying financing and other productive assets (Ardiansah & Rosadi, 2025). Prior studies report a positive association between profitability and firm value (Callista & Nariman, 2025; Pratiwi et al., 2023).

H3. Profitability is positively associated with firm value.

Research Framework

Figure 2 summarizes the hypothesized associations. Firm size and a UUS indicator enter the additional specifications as control variables and are not shown in the figure 2.



Source: Authors' elaboration (2026)
Figure 2. Research framework

Method

Research design and data

The study uses an explanatory, non-experimental design based on observational panel data. The estimated coefficients represent conditional associations, not causal effects, because the design does not exploit exogenous variation in the explanatory variables (Wooldridge, 2010). Total assets, total liabilities, and net income are audited year-end figures compiled by S&P Global Market Intelligence and accessed through stockanalysis.com and, for some observations, published in the banks' annual reports and investor relations pages. We used the same compiler for year-end market capitalization for 27 observations and computed it as the IDX year-end closing price multiplied by shares outstanding for the remaining 21. The authors collected sustainable-category (KKUB) financing and disclosure items from banks' sustainability reports. Listed companies must publish their annual report no later than the end of the fourth month after the financial year-end (OJK, 2016), so the 2025 reports were due by 30 April 2026 and were available for all sample banks at the time of data collection. The panel is balanced, with 48 bank-year observations. We compute variables and use them in estimation without rounding, and we provide the dataset and estimation script as supplementary material.

Table 1. Sample selection

No	Criterion	Entities
1	BUS and UUS operating during 2022–2025 (14 BUS and 18 UUS in December 2025, plus the BTN UUS)	33
2	Fewer entities that did not publish complete annual and sustainability reports for 2022–2025 through the IDX, including entities that are not listed and have no listed parent bank	(13)
3	Fewer entities with incomplete data on the research variables	(8)
	Sample banks (four BUS and eight conventional banks that operate a UUS)	**12**
	Years (2022–2025)	4
	Bank-year observations (12 × 4)	48

Source: Compiled by the authors (2026)

The population comprises the banks that conducted Islamic banking in Indonesia as a BUS or through a UUS during 2022–2025. OJK reports 14 BUS and 18 UUS in December 2025 (OJK, 2025). The population also includes the UUS of PT Bank Tabungan Negara (Persero) Tbk (BTN), which operated throughout 2022–2024 and transferred to PT Bank Syariah Nasional effective 22 December 2025 (Bank Tabungan Negara, n.d.), for a total of 33 entities. Because firm value requires a market price, a bank enters the sample only if its shares are listed on the IDX. A UUS has no shares of its own, and its sustainable-category financing is reported only as part of the bank that operates it. All variables are therefore measured at the listed-bank level. For the eight conventional banks in the sample, the

estimates describe banks that operate an Islamic business unit and not the unit itself. We selected the sample purposively using the criteria in Table 1, and Appendix 1 lists the resulting 12 banks: four BUS and eight conventional banks that operate a UUS. We retain BTN for 2025 because its bank-level variables remain observable after the transfer of its unit, which took effect nine days before the reporting date, and Table 5 reports a specification that excludes this observation. We excluded no observations for missing data.

Measurement of Variables

Table 2 defines all variables. The procedures for the variables that require judgment in data collection are described below.

Table 2. Variable definitions and measurement

Variable	Measurement
Firm value (FV)	Tobin's Q = (MVE + TL) / TA
Market value to assets (MTA), robustness	MVE / TA
Green investment (GI)	KKUB financing of the bank / TA
Green banking disclosure (GBD)	GBD = Σd_j / n, n = 21 items in Appendix 2
Profitability (ROA)	Net income / TA
Firm size (SIZE)	Natural logarithm of TA (IDR million)
Bank type (UUS)	1 if a conventional bank that operates a UUS, 0 if BUS

Source: Compiled by the authors (2026)

Note. MVE is the market value of equity at year-end; TL is total liabilities; and TA is total assets. All components refer to the listed bank. TL is total assets minus total equity, so it includes temporary syirkah funds for BUS and conventional banks alike. LEV, used in Table 5, is TA divided by TL. All variables are unrounded. KKUB denotes the sustainable business activity categories defined in POJK 51/POJK.03/2017.

Tobin's Q follows the approximation of Chung and Pruitt (1994) as the sum of the market value of equity and total liabilities divided by total assets. For every observation, the three components come from the same statement of financial position, that of the listed bank. Combining the market value of a parent bank with the liabilities and assets of its Islamic unit, as in the previous version of this study, mixes two reporting levels and is no longer used. Total liabilities equal total assets minus total equity, so temporary syirkah funds are included for BUS and conventional banks alike. This treats the two groups identically and avoids a mechanically lower Q for BUS, whose funding consists largely of such funds. We could not estimate a specification that excludes temporary syirkah funds because the split between liabilities and temporary syirkah funds was not available for all banks. Appendix 3 shows the computation for one observation. We use the market value of equity divided by total assets (MTA) as an alternative measure because it removes liabilities from the numerator.

GI (Green investment) is the amount of financing to the sustainable business activity categories (KKUB) reported in the bank's sustainability report, divided by the bank's total assets (OJK, 2017). Banks that operate a UUS report this amount for the bank as a whole, not separately for the unit, so all variables are measured at the bank level. Financing is used because lending is the main channel through which banks allocate funds to green activities. The KKUB categories include renewable energy, energy efficiency, pollution control, sustainable resource management, green buildings, and the financing of micro, small, and medium enterprises (MSMEs). Because MSME financing can dominate the KKUB total, GI partly reflects a bank's business model. We could not perform robustness checks that scale KKUB financing by total financing or exclude MSME financing from the numerator because the category breakdown and a consistent total financing figure were not available for all banks. This is acknowledged as a limitation.

GBD (Green banking disclosure) is an unweighted index equal to the number of disclosed items divided by the total number of items, where d_j equals 1 if item j is disclosed and 0 otherwise. The 21 items follow the Green Banking Disclosure Index of Bose et al. (2018), adjusted to the content of sustainability reports required by POJK 51/POJK.03/2017, and are listed in Appendix 2. They cover green banking policy, green financing, internal environmental management, environmental awareness and partnership, and the budget for and realization of green banking activities. One author scored every annual and sustainability report against the item definitions in Appendix 2, recording the page on which each disclosed item appears. Because a single coder performed the scoring, we could not assess inter-coder reliability, which we acknowledge as a limitation. Item-level scores are provided in the supplementary file.

ROA (Return on Assets) is net income divided by total assets. Losses are retained as reported. Bank Aladin Syariah reported net losses in 2022–2024, so its ROA is negative in those years.

For control variables, We Include Firm size (SIZE) and the UUS indicator in the additional specifications because they plausibly relate to both firm value and a bank's capacity to invest in green activities. The UUS indicator equals 1 for a conventional bank that operates an Islamic business unit and 0 for a BUS. Leverage is not included in the main specifications because total liabilities enter the numerator of Tobin's Q so that a leverage control would place part of the dependent variable on the right-hand side. Table 5 reports leverage as a separate specification. MTA serves as the alternative valuation measure.

Estimation. The baseline specification is a random effects model (Baltagi, 2021),

$$\mathbf{FV_{it} = \alpha + \beta_1 GI_{it} + \beta_2 GBD_{it} + \beta_3 ROA_{it} + u_i + \varepsilon_{it}}$$

where FV is firm value, GI is green investment, GBD is green banking disclosure, ROA is return on assets, u_i is the bank-specific random component, ε_{it} is the idiosyncratic error, i indexes' banks, and t indexes years. The extended model is

$$\mathbf{FV_{it} = \alpha + \beta_1 GI_{it} + \beta_2 GBD_{it} + \beta_3 ROA_{it} + \gamma SIZE_{it} + \delta UUS_i + u_i + \varepsilon_{it}}$$

The random effects estimator retains time-invariant regressors, so it can estimate the UUS indicator, which fixed effects cannot. Its consistency requires the bank-specific component to be uncorrelated with the regressors. The conventional Hausman (1978) test is invalid when errors are clustered, so we use a cluster-robust Mundlak (1978) test, which adds the bank means of the time-varying regressors to the random effects model and tests their joint significance (Wooldridge, 2010). We also report fixed effects estimates alongside the random effects estimates. The hypotheses are directional, but we report two-sided p-values as a conservative standard. Because errors within each bank are correlated over time, we use standard errors clustered by bank in all specifications. With G = 12 clusters, clustered standard errors can be biased downward and conventional critical values can over-reject, so we base p-values and confidence intervals on the t distribution with $G - 1 = 11$ degrees of freedom; the two-sided 5% critical value is 2.201 (Cameron & Miller, 2015). As a second check, we report wild cluster restricted bootstrap p-values with Webb six-point weights and 9,999 replications, applied to the transformed model (Cameron et al., 2008; MacKinnon et al., 2023; Webb, 2023). Significance stars follow the $t(G - 1)$ p-values, and the text states any differences from the bootstrap p-values. All models were estimated in Python with the linearmodels package (version 7.1) using unrounded variables.

Results and Discussion

Descriptive Statistics

Table 3. Descriptive statistics (48 bank-year observations)

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
Tobin's Q	1.271	0.970	4.676	0.877	0.752
MTA	0.480	0.122	4.340	0.031	0.855
GI	0.177	0.162	0.561	0.013	0.138
GBD	0.651	0.667	0.905	0.333	0.114
ROA	0.013	0.014	0.084	−0.056	0.019
SIZE	18.458	19.101	20.084	15.370	1.387
LEV	0.791	0.841	0.936	0.336	0.128

Source: Authors' calculation (2026)

Note. Q is Tobin's Q, MTA is the market value of equity to total assets, GI is green investment, GBD is green banking disclosure, ROA is return on assets, SIZE is the natural logarithm of total assets (IDR million), and LEV is total liabilities to total assets. Values are rounded for presentation only. Source: Authors' calculation (2026)

Tobin's Q has a mean of 1.27 and a median of 0.97. The gap reflects two digital banks, Bank Aladin Syariah and Bank Jago, whose Q exceeded 3.5 in 2022. GI averages 0.18 and ranges from 0.01 to 0.56. GBD averages 0.65, which corresponds to about 14 of the 21 items. ROA ranges from −0.056 to 0.084, and the negative values reflect Bank Aladin Syariah's losses in 2022–2024. Centered variance inflation factors are below 2 for all regressors in the model with SIZE and the UUS indicator, so multicollinearity is not a concern.

Baseline Estimation Results

Table 4. Random effects estimation of firm value (Tobin's Q), baseline model

Variable	Coefficient	Clustered SE	t	p, t(11)	95% CI	Bootstrap p
Constant	1.908	0.600	3.18	0.009	0.589 to 3.228	–
GI	2.762	2.399	1.15	0.274	−2.518 to 8.042	0.327
GBD	−1.150	0.681	−1.69	0.119	−2.649 to 0.348	0.110
ROA	−29.009	15.886	−1.83	0.095	−63.973 to 5.955	0.688

Source: Authors' calculation (2026)

Based on the authors' calculation, that information gives N = 48 bank-year observations and G = 12 banks. Overall $R^2 = 0.298$. Standard errors are clustered by bank. p-values and confidence intervals use the t-distribution with 11 degrees of freedom (critical value 2.201). Bootstrap p-values are from the wild cluster restricted bootstrap with Webb weights and 9,999 replications.

None of the three coefficients in the baseline model differs from zero at the 5% level. The coefficient on GI is positive with a wide confidence interval, and the coefficient on GBD is negative. The coefficient on ROA is negative and significant only at the 10% level under t(11), with a bootstrap p-value of 0.688.

The Mundlak test rejects the hypothesis that the bank means of the regressors are jointly irrelevant ($F(3, 11) = 4.59$, $p = 0.026$). The assumption that the bank-specific component is uncorrelated with the regressors is therefore questionable, and the random-effects estimates may be inconsistent. Table 5 reports fixed-effects estimates, which use only variation within banks over time and are given at least equal weight in the interpretation.

Additional Specifications and Hypothesis Tests

Table 5. Additional specifications

Specification	GI	GBD	ROA	SIZE	UUS	LEV	N	G	R^2
(1) Baseline	2.762 [0.274; 0.327]	−1.150 [0.119; 0.110]	−29.009* [0.095; 0.688]				48	12	0.298
(2) + SIZE	1.485 [0.429; 0.705]	−1.081 [0.109; 0.082]	−24.552* [0.065; 0.428]	−0.370** [0.018; 0.080]			48	12	0.494
(3) + SIZE, UUS	1.667 [0.429; 0.716]	−1.060 [0.117; 0.095]	−23.582* [0.092; 0.656]	−0.457** [0.047; 0.092]	0.405 [0.551; 0.617]		48	12	0.439
(4) Year effects	1.546 [0.463; 0.650]	−1.279 [0.114; 0.105]	−24.555** [0.047; 0.543]	−0.334* [0.095; 0.145]	0.165 [0.778; 0.842]		48	12	0.549
(5) Leverage	0.689 [0.433; 0.534]	−0.794* [0.086; 0.052]	−8.669*** [0.010; 0.056]	0.049 [0.695; 0.797]	0.098 [0.829; 0.839]	−5.718*** [0.000; 0.040]	48	12	0.719
(6) MTA	1.930 [0.426; 0.726]	−1.129 [0.119; 0.100]	−26.441* [0.095; 0.676]	−0.561** [0.035; 0.072]	0.493 [0.518; 0.574]		48	12	0.404
(7) Regressors t−1	0.756 [0.417; 0.429]	−0.396 [0.515; 0.653]	−11.708 [0.118; 0.587]	−0.216* [0.073; 0.116]	0.143 [0.703; 0.759]		36	12	0.579
(8) ln Q	0.923 [0.386; 0.599]	−0.524* [0.081; 0.068]	−6.265 [0.270; 0.710]	−0.268** [0.049; 0.068]	0.269 [0.519; 0.587]		48	12	0.375
(9) Excl. BANK	3.401 [0.281; 0.398]	−0.256 [0.299; 0.293]	5.734 [0.339; 0.755]	−0.326 [0.236; 0.626]	0.816 [0.307; 0.418]		44	11	n.a.
(10) Excl. BANK, ARTO	−0.077 [0.471; 0.576]	−0.310 [0.225; 0.196]	7.464*** [0.003; 0.034]	0.063* [0.066; 0.156]	−0.117** [0.033; 0.497]		40	10	0.392
(11) Excl. BBTN 2025	1.671 [0.428; 0.723]	−1.231 [0.117; 0.156]	−24.102* [0.085; 0.661]	−0.435* [0.053; 0.108]	0.366 [0.584; 0.654]		47	12	0.446
(12) BUS, pooled OLS	−4.547 [0.507; 0.636]	0.182 [0.942; 0.930]	−17.861 [0.201; 0.405]	−0.368 [0.239; 0.252]			16	4	n.a.
(13) Banks with a UUS	1.667 [0.325; 0.348]	−0.150 [0.742; 0.719]	−35.019 [0.215; 0.300]	−0.476*** [0.001; 0.021]			32	8	0.612
(14) FE, baseline	6.076 [0.111; 0.750]	−1.486* [0.081; 0.073]	−32.813* [0.065; 0.854]				48	12	0.545
(15) FE, + SIZE	3.013 [0.302; 0.574]	−1.448** [0.040; 0.046]	−17.847 [0.150; 0.348]	−1.322** [0.017; 0.015]			48	12	0.727
(16) FE, excl. BANK, ARTO	1.256 [0.404; 0.365]	−0.197 [0.422; 0.689]	15.303*** [0.000; 0.004]	0.099 [0.280; 0.186]			40	10	0.548

Source: Authors' calculation (2026)

Cells show the coefficient and, in brackets, the t(G − 1) p-value followed by the wild cluster bootstrap p-value. One, two, and three asterisks denote significance at the 10%, 5%, and 1% levels based on the t(G − 1) p-values. The dependent variable is Tobin's Q except in specification 6 (MTA) and specification 8 (ln Q). Specifications 1 to 11 and 13 are random effects models; specification 12 is pooled least squares because only four clusters are available, and specifications 14 to 16 are fixed effects models, in which SIZE is identified from within-bank variation, and the UUS indicator is absorbed. R^2 is the overall R^2 for random effects and the within R^2 for fixed effects. n.a., not available.

The coefficient on GI is positive in 14 of the 16 specifications but is not significant in any of them under either inference method. The smallest t(G − 1) p-value is 0.111 (specification 14), and the corresponding bootstrap p-value is 0.750. H1 is not supported.

The coefficient on GBD is negative in 15 of the 16 specifications. It reaches the 5% level only in the fixed effects model with SIZE (specification 15, p = 0.040, bootstrap p = 0.046), and it is close to zero and insignificant when the two digital banks are excluded (specifications 10 and 16). H2, which predicts a positive association, is not supported.

The coefficient on ROA is negative in the full sample under both random and fixed effects, but it is not significant under the wild cluster bootstrap in most specifications. Once Bank Aladin Syariah and Bank Jago are excluded, the coefficient is positive and significant under both inference methods (specification 10, $p = 0.003$, bootstrap $p = 0.034$, and specification 16, $p < 0.001$, bootstrap $p = 0.004$). H3 is therefore supported only outside the two digital banks.

SIZE is negatively associated with Tobin's Q in most specifications, and the UUS indicator is not significant under the bootstrap in any specification. In specification 5, leverage enters with a large negative coefficient. This estimate should not be interpreted substantively because total liabilities appear in the numerator of Tobin's Q. Several coefficients significant under $t(G - 1)$ are not significant under the wild cluster bootstrap, notably ROA in specification 4 and the UUS indicator in specification 10. We treat such results as not robust.

Discussion

Green Investment and Firm Value

The results do not show that investors price green investment. The estimated coefficients are imprecise, and the 95% confidence interval in the baseline model includes both economically meaningful positive values and negative values. The appropriate conclusion is that the data are insufficient to detect an association, not that none exists. Two features of the setting may contribute to this result. First, sustainable-category financing under POJK 51/POJK.03/2017 includes MSME financing, which can dominate the total so that the ratio may capture a bank's business model more than its environmental commitment. Second, with twelve banks and four years, only large associations could be detected. The result differs from the positive associations reported for Indonesian samples (Lehan et al., 2025; Putri & Paramita, 2025), which may reflect differences in samples, in the measurement of green investment, or in inference, since conventional standard errors over-reject when clusters are few (Cameron & Miller, 2015).

Green Banking Disclosure and Firm Value

H2 is not supported. The absence of a positive association is consistent with the argument that a mandatory, standardized disclosure regime leaves little variation for investors to price (Bose et al., 2018), and with international evidence that markets respond to the performance that disclosure reveals more than to its extent (Fatemi et al., 2018; Grewal et al., 2019). It is also consistent with low statistical power, and the present design cannot separate these explanations. The negative coefficient in one fixed effects specification should not be read as evidence that disclosure lowers firm value. It depends on the two digital banks, whose valuations fell sharply over the period for reasons that are unlikely to be related to disclosure, and it disappears when they are excluded. A checklist index also measures the extent of disclosure and not its quality (Clarkson et al., 2008).

Profitability and Firm Value

The instability of the ROA coefficient shows that valuation in this sample is shaped by two digital banks whose market values in 2022 were several times their total assets while their earnings were small or negative. For these banks, market value appears to reflect expected growth, which current accounting profitability does not capture. Among the remaining ten banks, higher ROA is associated with higher Tobin's Q, in line with prior Indonesian evidence (Callista & Nariman, 2025; Pratiwi et al., 2023). We did not specify the exclusion of the two digital banks in advance, so this result is an additional analysis, not a confirmatory test. Conclusions about profitability and firm value therefore depend on whether the population of interest includes such banks.

Comparison with the Previous Version of This Study

These findings differ from the previous version of this paper, which reported positive associations for green investment and intellectual capital efficiency. The difference follows from correcting data errors, measuring all variables at the listed-bank level, and using inference that accounts for the small number of clusters. The earlier results should therefore not be relied upon.

Conclusions

In a panel of 12 listed Indonesian banks with Islamic operations over 2022–2025, we find no association between green investment and firm value that is distinguishable from zero, and no positive association between green banking disclosure and firm value. The disclosure coefficient is negative in most specifications but significant at the 5% level in only one, and it is close to zero when we exclude two highly valued digital banks. These results hold under random and fixed effects, with firm size, bank type, year effects, lagged regressors, leverage, and an alternative valuation measure, and under both t(G − 1) and wild cluster bootstrap inference. Profitability is positively associated with firm value only when we exclude the two digital banks. Because the sample is small and the design is observational, the findings describe associations in this sample and do not rule out an effect.

Implications

The results do not support the expectation, derived from stakeholder and signaling arguments, that a costly green commitment is valued more than disclosure, as neither variable shows a robust association with firm value. The null result for a standardized, mandatory disclosure index is consistent with signaling theory, but it is equally consistent with low statistical power and should not be read as evidence of no association. For research on Islamic banking, the dual BUS–UUS structure is a measurement issue and not only a contextual one, because neither the market value nor the sustainable-category financing of a UUS is observable separately from the bank that operates it.

For managers and investors, this sample gives no evidence that a higher share of sustainable-category financing or a larger number of disclosed items is associated with a higher market valuation. This does not imply that such activities lack value, because the design cannot detect small associations or benefits not reflected in share prices. Descriptively, valuation appears more closely tied to bank-specific growth expectations, as in the two digital banks, although this was not tested. For OJK, the main implication concerns data. Requiring banks to report financing by TKBI category in a standardized format, with MSME financing separated from environmental categories and with separate figures for the UUS, would allow a more precise assessment of green commitments. This recommendation follows from the measurement constraints of the study and is not directly tested.

Limitations and Future Research

Several limitations qualify these conclusions. First, all variables are measured at the bank level, so for the eight conventional banks the results concern banks that operate an Islamic business unit, not the unit itself. Second, GI follows the KKUB definition, which includes MSME financing, and total liabilities include temporary syirkah funds. The breakdowns needed to test specifications without them are not available for all banks. Third, financial statement items come largely from a commercial data compiler without item-by-item tracing to the audited statements, market capitalization comes from two sources, and the GBD index captures the extent, not the quality, of disclosure and was scored by a single coder. Fourth, the Mundlak test indicates that the random-effects assumption may not hold, while the fixed-effects estimates rely on limited within-bank variation over four years. With 12 banks, the estimates are imprecise, sensitive to two digital banks, and unable to address reverse causality. Finally, the study removed intellectual capital efficiency because its inputs could not be verified, so it provides no evidence on that variable.

Future research could use listed BUS created through spin-offs, such as PT Bank Syariah Nasional, once sufficient market data exist, and separate the environmental KKUB categories from MSME financing. It could also measure disclosure quality with at least two independent coders and an agreement coefficient such as Krippendorff's alpha (Hayes & Krippendorff, 2007), and construct a green intellectual capital index (Chen, 2008). A longer panel of mandatory reporting would allow dynamic specifications and event designs around the introduction of TKBI in 2024. The bank-year data set with the source of each market capitalization figure, the item-level GBD scores, and the estimation script are provided as supplementary material.

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Appendix

Appendix 1. Sample entities

No	Ticker	Entity	Type	Price source	Years
1	BANK	PT Bank Aladin Syariah Tbk	BUS	Own listing	2022–2025
2	BTPS	PT Bank BTPN Syariah Tbk	BUS	Own listing	2022–2025
3	PNBS	PT Bank Panin Dubai Syariah Tbk	BUS	Own listing	2022–2025
4	BRIS	PT Bank Syariah Indonesia Tbk	BUS	Own listing	2022–2025
5	BDMN	Islamic business unit of PT Bank Danamon Indonesia Tbk	UUS	Parent (BDMN)	2022–2025
6	BNLI	Islamic business unit of PT Bank Permata Tbk	UUS	Parent (BNLI)	2022–2025
7	BNII	Islamic business unit of PT Bank Maybank Indonesia Tbk	UUS	Parent (BNII)	2022–2025
8	BNGA	Islamic business unit of PT Bank CIMB Niaga Tbk	UUS	Parent (BNGA)	2022–2025
9	NISP	Islamic business unit of PT Bank OCBC NISP Tbk	UUS	Parent (NISP)	2022–2025
10	BBTN	Islamic business unit of PT Bank Tabungan Negara (Persero) Tbk	UUS	Parent (BBTN)	2022–2025
11	ARTO	Islamic business unit of PT Bank Jago Tbk	UUS	Parent (ARTO)	2022–2025
12	BJTM	Islamic business unit of PT Bank Pembangunan Daerah Jawa Timur Tbk	UUS	Parent (BJTM)	2022–2025

Note. For banks 5 to 12, the Islamic business unit is the reason the bank enters the sample, and all variables refer to the listed bank as a whole. Source: Compiled by the authors (2026)

Appendix 2. Green banking disclosure items (n = 21)

No	Disclosure item
1	Bank policy on environmental conservation and climate change mitigation
2	Financing of environmentally sound projects and the mechanism for monitoring them
3	Efforts to reduce paper use through e-mail-based internal communication, and waste management
4	Policies and technology that minimize the environmental impact of internal operations, such as an electronic office
5	Use of environmentally friendly materials, recycled products, and solar power
6	Energy conservation in operations through electricity saving
7	Employee efforts to reduce climate change impacts and emissions
8	Green banking products, including online banking, ATMs, and mobile banking as means of reducing carbon emissions
9	Initiatives and partnerships of the bank on environmental issues
10	Assessment of the environmental impact of customers' business activities before financing is approved
11	Programs that raise environmental awareness in the community
12	Contribution to environmental improvement and to environmental reporting practice
13	Awards received for environmental conservation initiatives
14	Support for the provision of environmentally friendly facilities
15	Funds allocated to climate change mitigation
16	Implementation of green branches to improve operational efficiency
17	Environment-based marketing through internal communication media
18	Education and training of employees on green initiatives
19	Annual budget allocated to green banking practices.
20	Total funds realized for green banking activities.
21	Green banking reported in a separate section or page of the annual report.

Note. Each item is scored 1 if disclosed and 0 otherwise, and GBD equals the number of disclosed items divided by 21. Item-level scores are provided in the supplementary file. Source: Adapted from Bose et al. (2018)

Appendix 3. Worked example of the variable construction for one observation (PT Bank CIMB Niaga Tbk, 2023)

Market value of equity (MVE) = IDX year-end closing price × shares outstanding = IDR 42,598,740 million.

Total assets (TA) = IDR 334,369,233 million. Total liabilities including temporary syirkah funds (TL) = TA − total equity = IDR 285,031,862 million.

Tobin's Q = (MVE + TL) / TA = (42,598,740 + 285,031,862) / 334,369,233 = 0.980. MTA = 42,598,740 / 334,369,233 = 0.127. LEV = 285,031,862 / 334,369,233 = 0.852.

KKUB financing = IDR 55,451,293 million, so GI = 55,451,293 / 334,369,233 = 0.166.

Net income = IDR 6,551,401 million, so ROA = 6,551,401 / 334,369,233 = 0.0196. SIZE = ln(334,369,233) = 19.628.

GBD = 11 disclosed items / 21 = 0.524.